THE POLAR TIMES

Photograph of Mount Erebus, trailing its plume of smoke on a sunny morning in November, 1961, emphasizes a frequent contrast between the forbidding grandeur of the Antarctic landscape and the thriving wild life, here Adelie Penguins at Cape Royds on Ross Island.

Photograph, J. T. Jacobs, Canterbury Museum.

U.S. Navy

The antarctic scene. **Looking south at McMurdo Station and environs in December 1971. Hut Point, at lower right, forms the northern boundary of Winter Quarters Bay. Cape Armitage, upper right, flanks Observation Hill. Pram Point, upper left, is the site of New Zealand's Scott Base. Williams Field is above Pram Point on the Ross Ice Shelf. The annual ice runway is seen as dots above Cape Armitage.**

The Polar Times

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No. 74 *JUNE 1972*

Arctic Ice Floes to Be Tracked

Subs, Satellites and Lasers to Be Used to Find Ship Route

By WALTER SULLIVAN

The New York Times

March 1 —

A base camp is being established on a lonely ice floe as prelude to the most ambitious effort yet undertaken by the United States and its allies to understand what forces control ice movement in the Arctic Ocean.

The goal is to learn enough to forecast—and perhaps control—the pack ice sufficiently to permit tankers and ore ships to haul out the newly found riches of that region.

The study, which is expected to reach its climax two years hence, will make use of such sophisticated tools as automated submersibles, earth satellites, laser beams and instruments installed under the ice by specially trained swimmers. Most of them will be tested in the next eight weeks.

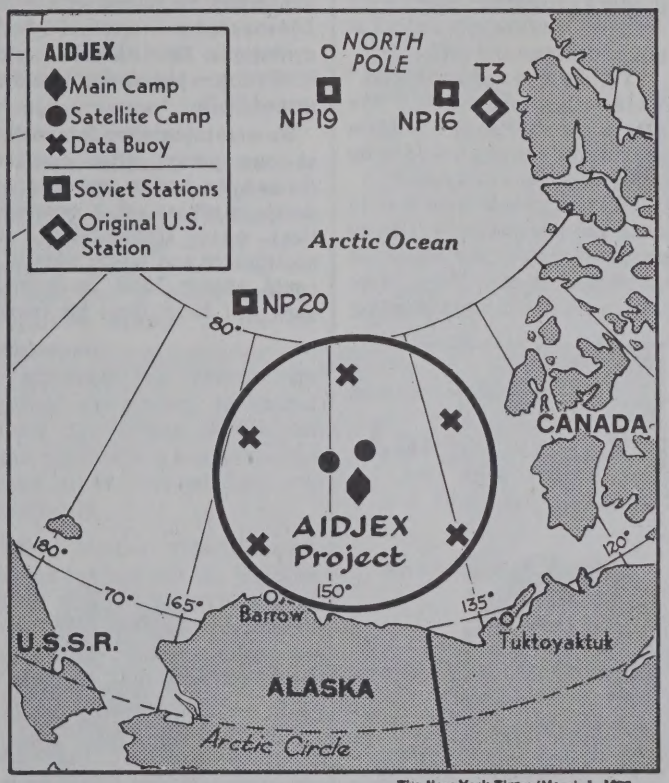
After that the spring sun, shining long hours on the base camp ice floe, will begin to soften the snow of the ski runway used by transport planes supporting the operation.

In recent days 16 men have been flown in, including two swimmers. The full complement will be about 80 Americans and Canadians, plus six Japanese.

The project, in preparation for several years, is known as AIDJEX (for Arctic Ice Dynamics Joint Experiment). A number of American Government agencies and universities are taking part, in addition to institutions in Canada and Japan.

After extensive flights over the Arctic pack a suitable base camp floe was selected and 286 miles north of Point Barrow, Alaska, and an initial landing made on Feb. 26. In recent days cargo planes have brought in much of the material for construction and outfitting of 28 buildings.

These are either Canada's semicylindrical Parcoll huts or square-sided prefabricated huts built by the Navy Arctic Research Laboratory at Barrow, Alaska. Two smaller stations each manned by two or three men are to be built, forming a triangle with the base camp that is 60 miles on each side.



The New York Times/March 1, 1972

Planes from Alaska are setting up an Arctic base for AIDJEX ice floe tracking project, as indicated above.

Around these three camps will be a circle of five data buoys frozen into the ice that will record weather data and aircraft overhead command them to do so.

There are four previously existing stations adrift on the floes. Three are Soviet, designated with N.P. (North Pole) numbers indicating the order of their establishment. The fourth is T-3, the venerable ice island first occupied by Col. Joseph O. Fletcher of the Air Force in 1952. It is also called Fletcher's Ice Island.

It is known that movements of the pack ice are controlled by a number of factors including wind, ocean currents, pressures induced by distant land and even, perhaps, a slight tilt to the sea surface.

The response of floes to these forces is determined, in part, by pressure ridges, sometimes scores of feet high, that act like sails in the wind, and comparable ridges under the ice that act like keels retarding wind response, but increasing the effects of currents.

Yet concrete data on all these effects are almost entirely lacking. One task of the swimmers is to map the under side of the base camp floe and install current meters around a keel-like pressure ridge that, it has been found, extends into the water there. These current meters, with small spinning propellers, will record water flow around the ridge.

To measure large-scale responses of the pack, changes in relative positions of the three manned stations will be recorded by monitoring signals from the Navy's navigation satellites. This should give positions accurate to within 50 to 85 feet.

To keep track of floe movements between such position determinations, expendable acoustic beacons are to be dropped onto the ocean floor, thousands of feet below. For close-in ice movements, laser reflectors are to be set up on towers erected at distances of about 10 miles in six directions from the base camp.

A laser beam that can be used for high-precision distance measurements will monitor changes in locations of these towers. Furthermore the Japanese are bringing a new electrical device for measuring variations of strain within the ice itself.

Japanese interest is rooted in that country's need for access to additional oil resources.

It is thought that wind and regional variations in air pressure cause tilting of the ocean surface and that this could cause floes to drift "down hill." Measurement of such tilt in the open sea is almost hopeless, but various devices are to be tried on the floes.

The remote-controlled submarine for under-ice surveying is being developed at the University of Washington, which is coordinating the AIDJEX project. However this year the surveying will have to be done by swimmers.

SUBMARINE TO AID STUDY OF WALRUSES

ORLANDO, Fla., Feb. 4 (UPI) —The Air Force says it is flying a little yellow submarine to Alaska so scientists will be able to study the habits of walruses under the Arctic ice cap.

The 18-foot research submarine will be placed aboard the Coast Guard ice breaker Burton Island at Seward, Alaska, and taken to the edge of the ice cap in the Bering Sea.

There, a group of scientists will use the submarine, which has a large transparent nose, to watch the walruses. Some will be followed to their feeding grounds under ice.

The chief scientist for the seven-week project is Dr. G. Carleton Ray, of Johns Hopkins University in Baltimore. The expedition is financed primarily by the National Oceanic and Atmospheric Agency, the National Science Foundation and the Office of Naval Research.

The submarine is the PC-8, built and owned by Perry Oceanographics, Inc.

AIDJEX Science cold situation

By GERALD E. BOWKETT
UA News Service

March 29

AIDJEX ICE STATION—The small cluster of prefabricated buildings and tents quickly grows smaller and is soon lost from sight in the vast expanse of the Arctic Ocean ice pack.

It is very cold inside the cabin of the R4-D, better known as the DC-3, and we decide against removing any of our heavy arctic clothing. Our backhaul of 21 empty propane cylinders smells up the interior, and John Schindler, director of the Naval Arctic Research Laboratory at Point Barrow, warns against smoking.

"It's in the interest of your health," he grins.

In the interest of keeping warm, we find it's better to move around the aircraft than sit down in one of the four seats, which seem to be at the level of the cold air mass in the cabin. In the frigid atmosphere, my ballpoint scribbling in my notebook soon comes to a halt and I am forced to switch to pencil.

The weather is perfect—bright and clear—and there is almost no turbulence. We have 286 miles of frozen ocean to cross to return to Barrow, almost due south from AIDJEX, and we will make it in about two hours in this ancient but highly reliable bird.

At the controls is arctic veteran R.G. (Dick) Dickerson, who has been flying for the Naval Arctic Research Laboratory for nearly eight years. As a lieutenant commander in the Navy in 1963, he piloted a C130 Hercules from South Africa to Antarctica and New Zealand, the first such polar flight in history.

We had had less than two hours at AIDJEX but fortunately got to talk for most of that time with Dr. Norbert Untersteiner of the University of Washington, coordinator for the big scientific effort, largest ever undertaken by the United States on Arctic Ocean ice.

In the sub-zero temperature, the R4-D's radial engines would quickly cool down, and this was the factor limiting its time on the ice. And during our brief stay, Dickerson restarted the engines several times—just to make sure.

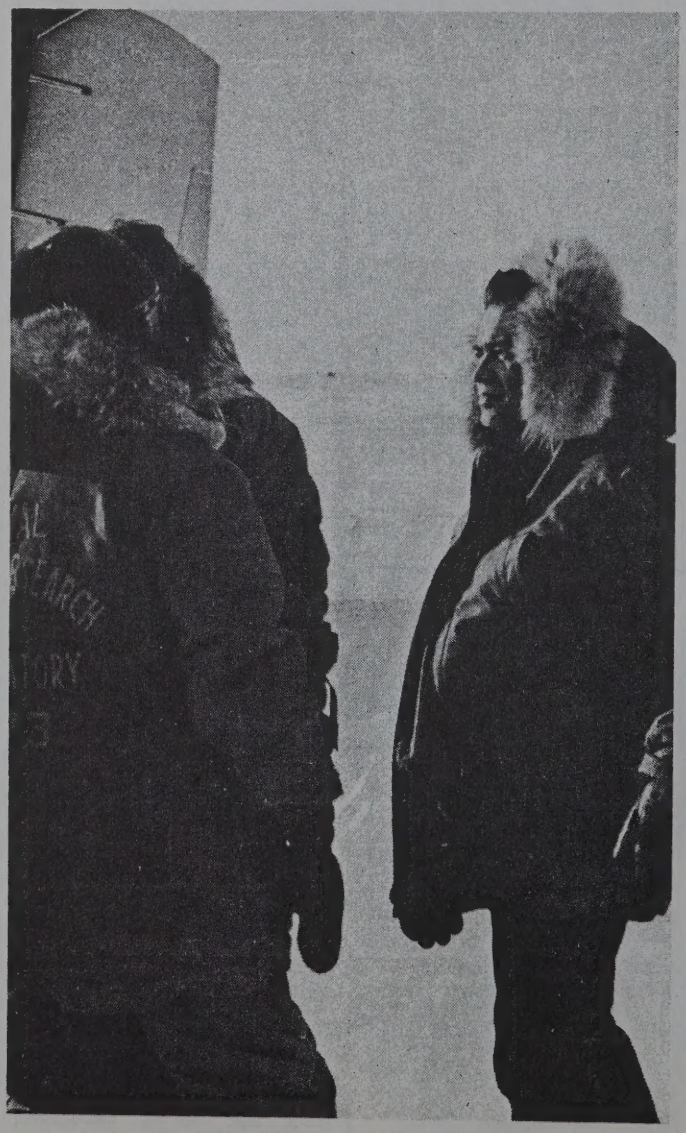
We had brought in a load of canned goods, and from the labels it appeared the scientists and support personnel on AIDJEX were eating well. There were cases of blueberry pie filling, hash brown potatoes, pear halves, minced clams, Dream Whip dessert topping and Aunt Jemimah pancake mix as well as flour, corn meal and coffee.

"Yes, we have very good food," Untersteiner confirmed. "We have a superb French Canadian cook whose cooking would be up to first class hotel standards."

Fifty-two people were then in camp and this number will rise to about 80 before the station is abandoned in early May, when the ice pack will begin breaking up rapidly, he told us.

We—myself and Jerold Sorensen, the University of Alaska's director of university relations—talked with Untersteiner in his 12 by 16-foot hut, which he shared with Rolf Bjornert, manager of field operations for AIDJEX, and Rolf's dog—a big, black rottweiler named Mollie.

We were interrupted frequently as one person after another entered the hut to report some development or ask a question that only Untersteiner, as coordinator and senior scientist, could answer. And he moved back and forth from his lower bunk to the big bank of radio equipment along one wall in response to calls crackling in to "Jumpsuit" from the two satellite ice stations designated "Blue Dog" and "Brass Monkey," stations some 60 miles from the main camp and from each other, all of which roughly form an equilateral triangle.



VISIT—Naval Arctic Research Laboratory Director John Schindler, right, makes his first visit to AIDJEX, established Feb. 25. The laboratory is operated for the Navy by the University of Alaska. *(UA photo)*

AIDJEX, acronym for Arctic Ice Dynamics Joint Experiment, is a multinational, intensive research effort with the goal of determining how the atmosphere and ocean influence the movement of the ice pack. To this end, some 26 diverse projects are being conducted at the ice station this year by American, Canadian and Japanese scientists from governmental agencies, universities, and institutes.

The present effort, despite its unprecedented scale, is still classified as a pilot study, said Untersteiner. It's the third such study. AIDJEX will come to an end with massive, year-long research on the ocean ice in 1974-75.

The data obtained from AIDJEX, said Untersteiner, will help solve many important theoretical and practical problems, among the latter navigation in the ice pack by tankers and other surface vessels.

The National Science Foundation and Office of Naval Research are providing the bulk of the financial support for AIDJEX. And most of the direct support—fuel, food, and other essentials for living and working in the hostile environment of the ice pack—comes from the Navy's research laboratory at Point Barrow, operated by the University of Alaska. As of March 13, more than half a million pounds had been delivered to AIDJEX by the laboratory's R4-D and Interior Airway's C130 Hercules aircraft, operating under a subcontract with the university.

The scientific effort on the ice is far from primitive. The latest in sensing equipment, lasers, and computers are being employed. The precise position of AIDJEX, now moving slowly westward, is regularly determined by feeding data from an overhead satellite into a computer.

For such a sophisticated approach, electric power is basic—and AIDJEX is fully

electrified. Two 40-kilowatt diesel-fueled generators are the main power source and there are a number of 6-kilowatt generators to provide emergency power in event of breakdown of the larger units.

The possibility of leads opening in the ice is a constant threat to the scientific experiment "but there is no real way to prepare for it," said Untersteiner, a veteran ice researcher. "All floes break up sooner or later and you hope it will be later. We've had camps that split up in the past."

Two days before our visit to AIDJEX a lead had opened nearby, between the camp and some equipment deployed on the ice. But a helicopter is based at the camp to retrieve men and equipment isolated by such an occurrence, as well as to supply the satellite ice stations.

"The threat to life under such circumstances is minimal," said the AIDJEX coordinator.

The ice station was established on Feb. 25 and Untersteiner came on March 2. The scientific experiment was now moving into high gear, and scuba divers in dry suits made their first dives beneath the ice to inspect its lower profile and emplace sensors, hydrophones and current meters.

A-TEST SAID TO YIELD USEFUL QUAKE DATA

WASHINGTON, Jan. 19 (AP) —The Government said today that recorded earth tremors from the huge the huge underground nuclear blast at Amchitka Island last November had yielded information that could help to predict and even mitigate natural earthquakes.

The report, by the Commerce Department's National Oceanic and Atmospheric Administration, (NOAA) said that it might take a year to fully analyze the data. But in listing "probable results," the report said:

"NOAA seismologists expect to extract significant new information on the casual mechanisms of [earthquake] aftershocks, and hope to be able to apply that knowledge to an improved understanding of natural earthquake source- mechanisms.

"Because this work might apply to natural earthquakes, it holds particular promise for scientists studying earthquake prediction and mitigation techniques."

The data might eventually help produce earthquake-resistant buildings, the report said.

MORTON APPROVES ALASKA PIPELINE

By WILLIAM M. BLAIR
The New York Times

WASHINGTON, May 11 — Secretary of the Interior Rogers C. B. Morton approved today construction of the controversial trans-Alaska oil pipeline. He said the action was "in the national interest" to gain needed energy supplies.

Conservationists immediately accused him of bowing to oil interests and vowed to continue a court challenge to the multimillion dollar project on the ground that it would pose irreparable damage to the environment.

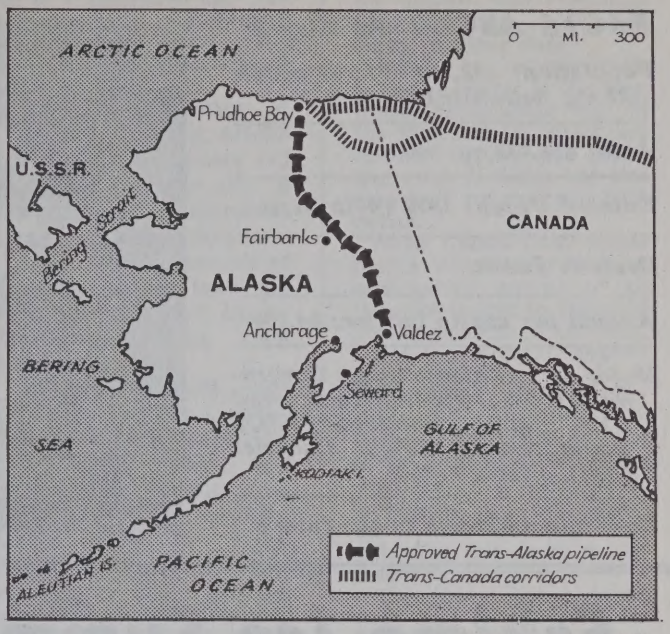
Although Mr. Morton approved the project, he cannot issue right-of-way permits for the pipeline and a construction road across Federal land immediately.

Mr. Morton rejected proposals for a Canadian pipeline route that conservation groups had demanded be studied as an alternative that might be less damaging to the environment.

"I am convinced that it is in our best national interest to avoid all further delays and uncertainties in planning development of Alaska North Slope oil reserves by having a secure pipeline located under the total jurisdiction and exclusive use of the United States," Mr. Morton said in a statement announcing his decision.

He conceded that there were some environmental risks in any means of transporting oil. But, he said, strict regulations had been drawn to minimize the threat of pollution from chronic or accidental oil spills on land or at sea. These regulations will also provide "maximum assurance" of protection against potential environmental damage from earthquakes along the proposed pipeline route.

He said that several factors made a bilateral arrangement with Canada for a pipeline "impractical at this time." These included, he said, a United States requirement for the entire capacity of any pipeline, uncertainty and delay in arranging financing of a trans-Canadian line to the Middle West, and delay caused by engineering and construction studies.



The New York Times/May 12, 1972

Large Group of Icebergs a Peril To Shipping in North Atlantic

By WERNER BAMBERGER
The New York Times

May 11

The largest group of icebergs to drift south of Newfoundland in nearly 30 years has put the Coast Guard and North Atlantic shipping on the alert.

Capt. Jean Nadal, master of the France, the largest passenger liner in the world, said after docking at West 44th Street yesterday morning that on Monday he swung south off the normal southern track for 45 miles to steer clear of an iceberg spotted on radar.

He said he did not share some of his 945 passengers' wishes to take a look at these floating hazards to navigation. He added that "the France has never been permitted within naked-eye range of an iceberg."

According to the Coast Guard here, some 550 icebergs have drifted far enough south to pose a "potential hazard" to ocean shipping. In cases of shipping bound for St. Lawrence River ports, the Coast Guard said, delays of up to 24 hours are being encountered.

The icebergs are in an area marked at the west by Cape Race, Newfoundland, south to a point 750 miles east of here. Its eastern limits are 1,300 miles east of here and 500 miles east of Cape Race.

They range in size from "growlers," less than four feet high and 20 feet long, to icebergs exceeding 150 feet in height and 400 feet in length.

Oceanographic experts attached to the Coast Guard's international ice patrol noted that the current season marked the fourth worst annual period for extreme southerly drift of icebergs.

The year 1929, with 1,357 icebergs, they said, was the worst, followed by 1912, with 1,119, and 1945, with 1,087, spotted south of the 48th parallel. In a less active year, the Coast Guard said, only 80 icebergs may drift south of Cape Race.

The iceberg watch was begun in 1912 after the 45,000-ton British liner Titanic, on her maiden voyage to New York, struck an iceberg and went down on April 15, 1912, with the loss of 1,517 lives.

The icebergs are born each year when they "calve" off the glaciers of western Greenland and are set adrift in the sea. It takes two to three years for an iceberg to drift into the Atlantic shipping lanes.

Alaskan Railroad Is Buying Surplus Passenger Coaches

ANCHORAGE, Alaska (UPI) —In an era of declining railroad passenger service, Alaska Railroad is buying 39 surplus passenger coaches with an original value of $3.5-million.

The purchases include dome cars, reclining-seat coaches, diners and bar cars.

The first 18 cars cost the state-operated line about $80,000.

FACTS ABOUT ALASKA

Population: 302,173 (77.6% white; 22.4% nonwhite).

Area: 566,432 sq. mi.

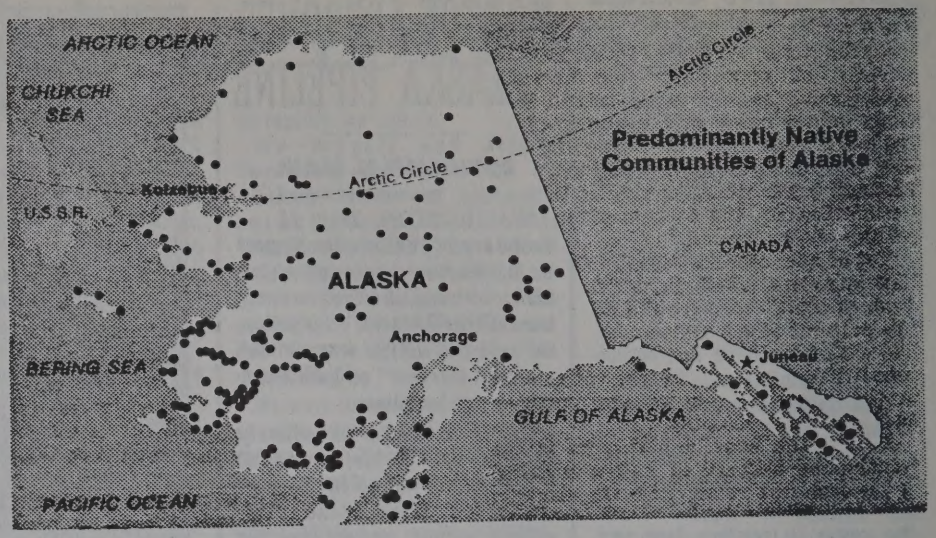
Entered Union: 1959 (49th State)

Capital: Juneau

Annual per capita income: $4,200

Major sectors of economy: Government (34%), wholesale and retail trade (15%), services (11%), manufacturing (8%), fisheries (3%), mining (3%).

State motto: North to the future



Eskimo Ice Summit Thaws Cold War

LITTLE DIOMEDE ISLAND, Alaska (AP)—While statesmen and diplomats meet to thaw American-Soviet relationships, Eskimos of both countries recently met on the icepack near the top of the world to rehash their heritage and swap cigarettes.

The meetings were held on international Bering Sea ice where 2½ miles separate the Soviet territory of Big Diomede Island and Little Diomede Island of Alaska.

American and Soviet military forces observed the meetings through telescopes but U.S. military spokesmen said "we don't consider it a military matter."

The Siberian Eskimos were moved from Big Diomede in 1947 to the mainland and last month some of them returned for a midwinter hunt for white fox.

One, named Yakoolik, happened on Jimmy Iyapnna while the American Eskimo was breaking ice in search of seal March 23.

"Jimmy knew him well when they lived on Big D," said Robert Soolook, mayor of the Little Diomede village.

They arranged a meeting for a week later involving three men from each island.

All the people of Little Diomede were happy, according to their mayor, "about knowing that some of their friends that they knew before were coming to visit us.

"It was a real good visit and it made everybody happy. They asked about all the old timers in the village . . . if they were still living.

They exchanged gifts, the Eskimos from the east giving tea, cigarettes, candy and sugar and their American relatives' cigarettes and chewing gum, Soolook said.

"We smoked some of the cigarettes but we don't like them as well as ours," he said. "Some tasted like cigars. They like chewing gum. We gave them lots of chewing gum."

Bureau of Indian Affairs employee Paul Harris said the conversation came hard.

Harris said he was told by villagers the Siberians spoke an old Eskimo dialect no longer used on Little Diomede. From among the six, however, an interpreter was found. The Siberian trappers have returned to the Soviet Union.

"They said they would like to come back in the summertime by skinboat if they could," said Soolook.

The Polar Times

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AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

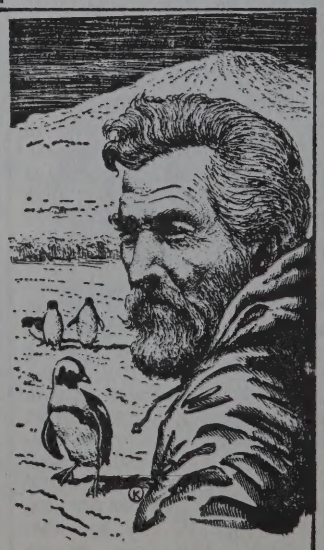
The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are one dollar a year, which entitles members to receive THE POLAR TIMES twice a year.

Back issues are 50 cents each.

WANT AD SHOWED SHACKLETON MANY EAGER TO TAKE POLAR TRIP

"MEN WANTED for hazardous journey. Small wages, bitter cold, constant danger, safe return doubtful. Honor and recognition in case of success. Address E. H. Shackleton . . ."

In his book, "The 100 Greatest Advertisements" Julian Lewis Watkins related how the explorer, Ernest Shackleton, was swamped with applications when he ran the above Classified Ad in 1900 seeking men to go on an Antarctic expedition. Said Shackleton, "It seemed as though all the men in Great Britain wanted to accompany me."



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A Remote Alaska Town Travels by Snowmobile

By EDWARD C. BURKS

The New York Times

BARROW, Alaska—You're 500 miles from anywhere—that means Fairbanks—and there are no road connections at all. But watch out for the speedy traffic on the ice-packed streets of this northernmost town in the United States.

Don't look for dog sleds. Except for one used for tourist purposes in the summertime—when they have to put rollers on it—virtually all sleds have disappeared.

The big noise in the awesome, around-the-clock Arctic night is that of the snowmobile. In this Eskimo village of 2,500 people, snowmobiles have become so popular that often there are two to a family.

A parka-clad housewife careens around the sharp corner and comes to a stop in front of Shontz's general merchandise store on a shopping expedition.

Young blades use their snowmobiles, Skidoos or Snow-goers, as they are variously called, for trips to the Eskimo Cafe and Barrow "night spots"—the Polar Bear Theater, which becomes a dance hall after the last show; Alice's Cafe, and The Hut, a Quonset recreation center.

A highway connection "down south" to Fairbanks seems to be a matter for the vague and distant future. Not only is the intervening area one of rugged mountains and unpredictable tundra but also there are just not very many people to be served by such a road.

However, Barrow has been projected into the world of modern America by two things—its daily jet plane connections to the south and, even more important, the extension of heat by means of natural gas lines to the many bleak blocks of frame homes.

The Boeing 737 jets of Wien Consolidated Airlines bring in the kind of supplies and amenities enjoyed by typical towns all across America. That means everything from mail order fabrics to TV sets and TV dinners. (There's a cable television system in operation here.)

And the modern gas heating, available to the town at large only since 1965 when the naval installation here extended lines from its gas wells to serve Barrow homes, has transformed life. Before that, Barrowites got through the bitter subzero winters with smoky oil heating, and up to a generation ago they were forced to rely on driftwood, whale blubber and some supplies of low-grade coal.

With the assurance of clean heat the town, despite its isolation, has grown and prospered and been able to afford such transportation items as the snowmobiles.

In addition to hundreds of snowmobiles, the town has some 200 cars and trucks, plus two Alaska state troopers.

Vehicles equipped with four-wheel drive are necessary. The local magistrate, Mrs. Sadie Neakok, and her husband, Nathaniel, also boast a surplus military weasel good for cross-country travel on its tracks, not only in winter time but also for summer camping trips when Barrow's streets are sometimes a quagmire.

Although the town is small, the vehicle has become indispensable for all sorts of cross-country expeditions including hunting, and during the absolute winter night lasting for two months from mid-November, for just getting around the village. The Naval Arctic Research Laboratory on the edge of town also requires a fleet of vehicles.

In January the temperature may tumble to 50 and 60 degrees below zero and just stick there. In the brief but radiant summer, when the sun is up around the clock, the thawing makes for tougher road conditions sometimes than the worst winter weather does.

Barrow not only has taxis to take a visitor to the long, frame, barrackslike Top of the World Hotel, which has two-bed cubicles and primitive toilet facilities, but also cabs that are equipped with radios.

Wien Consolidated planes haul a few passengers and a considerable amount of all types of freight to the local airfield near the Arctic coast, which is at about 71 degrees north latitude. The planes make the run to and from Fairbanks in 80 minutes on weekend nonstop flights and in 135 minutes on weekdays when there is a stop at Deadhorse Airport, which serves the North Slope oilfields region. The ride to Fairbanks costs $65.

The airport has a paved strip, and it is named for Wiley Post, the famed around-the-world flyer of the nineteen-thirties, and Will Rogers, who crashed near here more than three decades ago.

While Barrow has given up on the dogs and gone to the motors, remote Eskimo settlements on the Arctic shore such as Wainwright (population 386) still use dog teams for hunting and as the main mode of transportation.

The New York Times/Edward C. Burks

A snowmobile on snow-covered street in Barrow, 500 miles north of Fairbanks, Alaska

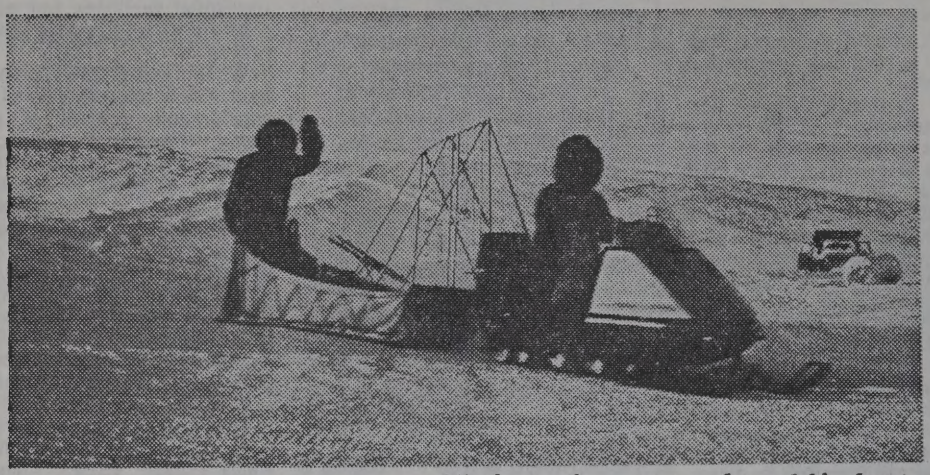
Eyes on Voting

Juneau, Alaska, June 29 (UPI)—An 88,258-square-mile borough was voted into existence on Alaska's oil-rich north slope by 431 Eskimos, state officials confirmed today. Certification of the June 22 election in five villages scattered on the slope took place yesterday in Nome. Ballots were still being counted today, with returns indicating that Eben Hopson, a Barrow Eskimo, would be chairman of the borough. Alaska Lt. Gov. H. A. Boucher will sign incorporation papers creating the borough, which is larger than the state of Utah on, Monday. The borough will have the power to tax oil company holdings in the tundra.

Quake Hits Amchitka Area

PALMER, Alaska, Jan. 3 (AP)—An earthquake measuring 5.6 on the Richter scale occurred this morning about 60 miles north of Amchitka Island in the Aleutian Island chain, the Palmer observatory reported. Amchitka Island was the location of last November's five-megaton underground nuclear explosion.

Civilization, Good and Bad, Invades the Canadian North



Constable Ron Kingdon uses a snowmobile for motive power as he and his deputy make their rounds at Sachs Harbour, in the vast, cold Northwest Territories of Canada.

By JAY WALZ
The New York Times

INUVIK, Northwest Territories, March 13—"This is my dream of Whitehorse, when 50 years have passed," wrote Robert W. Service in the early nineteen-hundreds. "I tottered along the sidewalk/That was made of real cement/A skyscraper loomed above me/where once I remembered a tent."

With government services expanding and expectations of oil and gas strikes running high, the Yukon balladeer's vision of the Canadian North is rapidly becoming a reality.

Whitehorse, population 5,000, has cement sidewalks and broad paved streets. Yellowknife, population 3,500, capital of the Northwest Territories, has a high-rise apartment house and a six-story territorial government building. And Inuvik, a government town of 3,500 lying 125 miles north of the Arctic Circle, has a 5 o'clock scurry of cars and snowmobiles that is just short of rush-hour dimensions.

Jet planes land daily at the Inuvik airport, a modern strip atop the tundra, bringing oil drillers, construction men and cargoes of gear, food and liquor.

No doubt Service would also report on the more sinister signs of changing civilization. Along with modern housing, electricity, schools and welfare checks, the Eskimo and Indian have learned about occupational dislocation, unemployment and emotional depression, all leading to excessive drinking, violence and a high suicide rate.

If the new society has virtually wiped out once-prevalent tuberculosis, it has introduced rampant venereal disease.

There are other problems. As whites from the South, particularly wives, try to adjust to the long, dark, severely cold winters—and the 24-hour sunlight of summer—they develop "cabin fever," the psychiatrists' term for acute depression resulting from bleak confinement.

There are not enough doctors and psychiatrists to go around, so serious cases are referred to government or community hospitals that are ill-equipped to cope with them. The extreme casualties are evacuated 1,200 to 1,500 miles to the federal Charles Camsell Hospital in Edmonton, Alberta, where treatment is excellent. But the environment "outside" often leads to new disaster.

"Life in the North is tough," said Dr. Ali Uyger, the Turkish-born area director of the programs of the Department of National Health and Welfare in Yellowknife. "Too many whites come up simply to run away from the rat race down South. There is much more to living in the North than escaping."

Dr. J. D. Atcheson, associate professor of psychiatry at the University of Toronto, predicted in a recent article that unless a "rational economy" was worked out for all northern peoples and until "cultural erosion and racial discrimination" were checked, the major problem would be ever-increasing violence. He even suggested that Frobisher Bay on Baffin Island and Inuvik might be the scenes of racial disturbances comparable to outbursts in black ghettos in the United States.

However, most Eskimos and Indians whom a visitor is likely to encounter seem docile and friendly.

The loiterers in the lobby of the Yellowknife Inn are not necessarily vagrants or prostitutes. "They're lonely people with nothing to do but wait for the next welfare check," a townsman explained. But often, one learns, docility and a wan smile conceal anxiety and resentment.

Statistics on mental instability are hard to find. The Health Department is making a study at Frobisher Bay, Baffin Island. The Northwest Territories Mental Health Association, a private organization of interested laymen, obtained a federal grant of $49,000 to conduct a mental-health survey in 25 communities.

"After finding out what lies behind emotional stress and mental breakdown—boredom? the long, dark winters? absence of 'something to do'?—we want to provide remedial service," said Mrs. Jo MacQuarrie, association president. "We expect to develop education and rehabilitation programs later."

It is not established whether the Artic peoples had hangups before the white man came with his social and economic pressures, but legends involving witches and wizards suggest that they did.

The Yukon and Northwest Territories, embracing more than 40 per cent of the Canadian land mass, extend from the 60th parallel to the North Pole. Only about 53,000 people (33,700 whites, 11,000 Eskimos and 8,300 Indians) live there—some 100,000 square miles for each man, woman and child. Remote settlements may have only a handful of inhabitants and a few transistor radios for communication with the outside world.

A succession of Governments in Ottawa has pursued

'I Wish They'd Just Let Us Be'

Special to The New York Times

SACHS HARBOR, Northwest Territories—"Trapping is my life, and I wish they'd just let us be," Andy Carpenter told a visitor. "But my children will never be satisfied to be trappers. I doubt if any of my four sons will learn to trap."

"They" are the government and, now, the oil explorers. Both are changing Canada's Far North.

Mr. Carpenter concedes that by putting the children in school the government broadens outlooks and stirs ambitions. But it also lures them from the traditional way of life.

On a recent Sunday Mr. Carpenter received a mainlander in the comfortably furnished living room of his modest but modern government - built house, for which he pays a rent of about $60 a month. A raw musk-ox hide lay on the floor.

A transistor radio was bringing the Sunday gospel service from Fairbanks, Alaska. In the kitchen, Mrs. Carpenter, using an electric mixer, prepared a cake.

Mr. Carpenter, who is 39 years old and of Eskimo and Caucasian parentage, looks to a good year. But there are poor years too, he said.

Not this year, for only one person in the population of 112, an old woman without family, is on public welfare.

a policy of developing the North economically and, at the same time, of improving the lot of the people who have survived there. The Government spends well over $100-million a year "developing" the people of the North.

Nonetheless, there has been trouble since it was found unfeasible to set up schools, hospitals or even nursing clinics in small, isolated outposts. It was decided that since the government could not in all cases go to the people, the people should be brought to the government.

Hundreds of children, from first graders up, are airlifted 300 miles or more to big, modern boarding schools in Inuvik — one for Roman Catholic pupils of all races and one for Anglicans — where they spend the school year.

Settlements of 100 or more may have a nursing station staffed by one or two registered nurses — so far all of them young white women — while an itinerant doctor may make periodic rounds. Emergency cases must be evacuated by charter aircraft to Inuvik, Yellowknife, Whitehorse, Frobisher Bay or Edmonton.

The handsome, efficiently run regional schools here, which are shown to visitors as models, offer Eskimo and Indian children training that is said to be as good as any in the Canadian South. And so they would seem to do. But in interviews parents complain that the schools produce alienated, disrespectful and disobedient children.

Dr. Brian Brett, acting director of the Northern Health Services, said that native children at regional schools discovered that there were many good things in life that are taken for granted in the white world. "The Eskimo or Indian comes to appreciate some of these luxuries while at school and to disdain parents who may never have heard of them and, in any case, cannot provide them," he explained.

So far the white world has produced few jobs for Eskimos and Indians discovering its amenities. A visitor hears of innumerable examples of teen-agers who come out of the schools only to drift from one menial job to another. They lean increasingly on public welfare, which gives them enough cash for escape in drink. In many cases the young women end up in prostitution and the young men in jail for disorderly conduct.

Sociologists working here say that the abuse of alcohol

The New York Times/April 1, 1972

Arctic metropolises: Whitehorse, Yellowknife and Inuvik

is rapidly becoming the paramount social problem. Last year the 30,000 people in the Northwest Territories spent $5.6-million for government-distributed beer, wine and spirits—an average of $180 per capita. Almost 50 per cent of deaths due to violence and accidents—fights, fires, freezing—were attributable to "overindulgence" in drink, an official report said.

"One of the reasons people drink a lot is because there's nothing else to do," said Bryan Pearson, a territorial councilman who advocates putting liquor-store profits into recreational facilities.

Miss Nellie Cournoyer who manages the Inuvik radio station of the Canadian Broadcasting Corporation, told a visitor: "People, including Eskimos and Indians, don't drink for nothing." Miss Cournoyer, who is of Norwegian and Eskimo parentage, is active in the Committee for Original Peoples' Entitlement, which seeks full civil rights for Eskimos, Indians and métis (those of mixed background).

She rejects charges by white employers that native people are not hirable because they are unstable, unreliable and lazy. "The bosses use this as an excuse," she said. "Actually, the white administrators have taken away all sense of social responsibility among our people."

Dr. Gordon C. Butler, who spent 10 years in the Canadian Arctic as a public-health doctor and medical services administrator, takes a different view.

"The Eskimos never had a way of life," he said in an interview. "Theirs was only a way of survival. They hunted to eat. In poor hunting years many starved. Old people no longer useful were allowed to walk away over the ice, when it was known they wouldn't come back. Parents, hoping for a son, put infant daughters out to die."

Ottawa's policy-makers often express their own frustrations in coping with the northern development problem. Should we or shouldn't we touch the native people's way of life? they ask. If there is a consensus among the federal authorities, from Prime Minister Pierre Elliott Trudeau down, it is this:

The North's great natural resources, including the waters and the Northwest Passage itself, are bound to be developed and exploited. It is only a matter of timing—when the known resources are needed, ways will be found to take them to market. And it is not fair to the native peoples to leave them out, for they are Canadians too.

Whatever Ottawa decides, there is little prospect that the isolated outposts will grow into self-sufficient modern communities, nor will they "just be left alone." As oil, gas and mineral deposits are exploited and roads and communications developed, it is likely that there will be greater population concentrations—and more disturbed people.

5 Countries Asked To Prohibit Hunting Polar Bears on Seas

The New York Times

GENEVA, Feb. 12—Scientists from five countries with territory extending into the far north have asked their governments to conclude an agreement to prohibit the hunting of polar bears on the high seas.

A spokesman for the International Union for the Conservation of Nature said that such a ban would save a large number of bears who live on pack ice outside territorial waters.

Scientists from the United States, Canada, the Soviet Union, Norway and Denmark decided on this recommendation at a four-day meeting at Morges, near here, yesterday.

The world's polar-bear population has now shrunk to 10,000 or 20,000, the spokesman said.

The proposed ban, however, would not restrict the traditional rights of local populations to kill polar bears for food and fur.

The scientists also recommended action by governments to protect dens and feeding areas of the bears.

The Soviet Union is the only country that has imposed a complete ban on hunting and exploitation. Canada, with the largest polar-bear population, has prohibited killing in Newfoundland and Labrador and has imposed quotas in the rest of its polar territory. Norway has prohibited hunting the bear from airplanes, and the United States is expected to follow suit next year, participants in the meeting said.

FOREST OIL REPORTS FIND ON NORTH SLOPE

The Forest Oil Corporation said June 16 that it had discovered hydrocarbons "in apparent commercial quantities" at its No. 1 Kemik wildcat well on the North Slope of Alaska.

The discovery is about 20 miles southwest of the American Oil Company's Kavik well and is about 55 miles south of the Prudhoe Bay oil field.

Forest declined to release any details concerning producing horizons, volume pressures or depths for reasons of "competitive security." The Forest well is one of the two wildcat wells being drilled on the North Slope.

Forest had announced earlier that the well was being drilled on a large structure revealed in a seismic program conducted in late 1969.

CANADIAN ASSAILS POLICY ON ARCTIC

Calls Oil Search a Threat to Eskimos on Island

By EDWARD COWAN
The New York Times

TORONTO, Feb. 19—Peter J. Usher, a geographer employed by the Canadian Government, has accused his own department of putting development of resources in the far north ahead of the well-being of Eskimos and protection of the Arctic environment.

Mr. Usher reaches this conclusion in a 74-page review of oil exploration on Banks Island, which lies off the Northwest Territories. The island, half the size of New York State and separated from the mainland by Amundsen Gulf, is the home of 100 Eskimos who support themselves by trapping white foxes.

The Government, Mr. Usher says, has failed to acknowledged that there is a "serious conflict between oil and fur on Banks Island."

Ottawa's resolution of the Banks Island case, Mr. Usher asserts, "suggests that the Government has decided that the welfare of native northerners and the northern environment are to be sacrificed in favor of large-scale economic development for the benefit of southern Canadians and foreign corporations."

Mr. Usher works in the northern science research group of the Department of Indian Affairs and Northern Development. In the nineteen-sixties, when he was a graduate student at the University of British Columbia, the department financed much of his research for a doctoral dissertation on the economy and ecology of Banks Island.

The department has published Mr. Usher's study in three volumes for limited distribution to people with a special interest in the Arctic. The third volume, covering oil exploration in 1970-71 by French and German oil companies, came to public notice earlier this month.

Mr. Usher argues that the white citizens of southern Canada are morally responsible for what happens to the Eskimos and the northern Indians as a consequence of the search for oil, natural gas and minerals.

Since American, British and other foreign companies are participating in a wave of exploration north of the 70th

The New York Times/Feb. 20, 1972

parallel, and since Canada is re-examining the benefits of foreign capital, Mr. Usher's indictment is of interest abroad.

Similar criticisms have been voiced in Alaska. The immediate issues are:

¶Ottawa's licensing of the French and German oil companies to conduct seismic tests, underground blasts whose reverberations are monitored, on Banks Island.

¶The department's response to protests by Eskimo trappers who feared that their livelihood and independent way of life were jeopardized.

Mr. Usher contends that the Government permitted the tests in the absence of information that no harm would result. As he sees it, Ottawa put the burden of proof on the trappers, not the oil companies.

This is the heart of a conflict that Mr. Usher finds resolved in favor of the companies. It was, he says, another example of the tendency of "the metropolis" imposing its will on "the hinterland."

Mr. Usher contends that Government officials "share the same basic purposes and life as executives, lawyers, engineers and technicians."

A spokesman for the minister of Indian Affairs and Northern Development, Jean Chrétien, said that Mr. Chrétien had no comment for the moment on Mr. Usher's criticism. In the past, Mr. Chrétien had emphasized restrictions on the seismic crews.

If and when Mr. Chrétien does reply, he will presumably say that the Bankslanders willingly accepted a compromise because they were mindful of the jobs that oil would create for their better-educated children who, as Mr. Usher reports, are disinclined to become trappers.

Mr. Usher's view is that the trappers accepted the Minister's terms because "their resistance was broken" and they felt "resentful and beaten."

Mr. Chrétien's associates argue that the alternative to resources development is for young Eskimos to find jobs in southern Canada and be absorbed by an alien, inhospitable culture.

Ottawa also has said that the resources of the far north belong to all Canadians, not to the indigenous peoples alone.

Arctic Island Oil Strike Yields Promising Sample

The New York Times

MONTREAL, Feb. 27—Ellesmere Island, lying with its magnificent fjords just below the permanent ice cap and only 700 miles from the North Pole, has been best known for the Eureka and Alert weather stations.

Now it has hit the headlines as the location of the first oil strike in the Arctic islands. It lies at the north end of the great sedimentary basin that sweeps up from the North Shore of Alaska, northeast through the Sverdrup Basin, skirting the ice cap through scores of small and large islands to Ellesmere.

The island's area is roughly equal to that of Britain.

Charles Hetherington, president of Panarctic Oils, which has an 80 per cent interest in the Ellesmere wildcat Romulus No. 2 C-42, could well relish the scent of the sample that reached Calgary late Thursday. He pronounced it "oil, clear and sweet."

The oil brought up by the test well deep from a sandstone formation about 3,500 feet is light. It is low-sulphur crude, the grade that is in such demand on the East Coast of North America because of efforts to fight pollution.

The Romulus No. 2 test well, on the Fosheim Peninsula, is being drilled with a special $1.3-million rig built last year for work in the high Arctic. It will go to 12,000 feet, probing the cretaceous-Jurassic and Heiberg formations further down.

There are oil seeps on the surface at many places in the Arctic islands, particularly on Melville and Ellesmere. These occurrences and the broad geology of the Arctic sedimentary basins were logged extensively in the late fifties and early sixties by the late Cameron Sproule, the man whose faith in the Arctic islands led to the formation of Panarctic Oils.

The fact that oil has flowed from the upper sandstone formation gives hope that a major trap may be found lower, oilmen say. And that might be the key to a major reservoir.

The New York Times/Feb. 28, 1972

Romulus No. 2 is the second probe for oil on the Fosheim Peninsula, on the west coast of Ellesmere. It is 25 miles from the first well, which was abandoned earlier.

Panarctic holds permits covering about 55 million acres in the Arctic islands, and in the last 42 months has made four commercial gas finds. These were the original discovery on Melville Island in 1968, two wells on King Christian Island in 1970 and at a discovery at Kristoffer Bay, on Ellef Ringnes Island last December.

The company has completed 15 wells on its own account since 1968 and has been associated in 13 other tests on pooled acreage with its private shareholders. In all there have been 35 wells drilled in the Arctic islands since 1962.

Arctic Gas Estimate Given

The Dome Petroleum Company, in a letter to the Canadian National Energy Board, estimated that more than 15 trillion cubic feet of natural gas had been discovered in the Canadian Arctic. The company said it "believes there are no technological reasons why this gas won't be on stream within the next few years."

Totem Pole Is Stolen

ANCHORAGE, Alaska (UPI)—A shoplifter strolled down the concourse of the Anchorage International airport terminal, picked up a 56-pound, 7-foot totem pole in front of a gift shop, toted it to a truck and drove away, the police reported.

Canadian Troops Leading the Way in 'Nation Building'

By DREW MIDDLETON
The New York Times

OTTAWA—Canada's armed forces have widened their role to include such unwarlike but necessary missions as environmental security and the opening of North America's last frontier in the Arctic.

These missions in support of the civil authorities are in accord with the popular urge to strengthen the national identity through accelerated social and economic development.

The United States Army generally refers to this function as "nation building," although the term is usually applied to countries far less advanced than Canada.

Canada sent hundreds of thousands of men overseas to fight in two World Wars. She remains a member of the North Atlantic Treaty Organization, although her contribution to Europe's defense has been reduced.

But a new generation of soldiers, officials and politicians appears to find equal satisfaction in the detection of pollution at sea, in mineral exploration and in the exploitation of the Far North.

Donald S. Macdonald, who headed the Defense Ministry before he was named Minister of Energy, Mines and Resources in January, considers the armed forces' role in the Arctic analagous to that played by the United States Army in the West after the Civil War. In vast areas, he said, "the forces are the only organization with the manpower and skill to build the airstrips and bridges that will open the frontier."

Last year, the 100th anniversary of the Canadian armed forces, was a time of deepening incursion into the Arctic. Between May and August the Arctic coast from Coppermine, north of Yellowknife, to the Melville Peninsula was surveyed for the production of more than 300 maps. Military engineers also completed a steel bridge over the Ogilvie River in the Yukon.

Resistance to such activities from the local authorities or trade unions is seldom encountered in the almost empty North. Instead, territorial governments ask for help.

Mr. Macdonald conceded that some commanders felt that the forces would be better occupied sharpening their military edge. But he and his former military associates clearly consider that the push given Canada's development outweighs any temporary reduction in combat readiness.

The armed forces are also playing a role in surmounting the basic impediment to national unity: the bilingual and bicultural character of the country.

Civil servants and officers consider the armed forces one of the best means of overcoming divisions inherent in a bilingual society. As the current white paper on defense policy puts it, "The Canadian forces have a major role to play in promoting national unity."

United Press International

NOTHING TO HOOT ABOUT: Bandaged after surgery, snowy owl, who fared second-best in collision with private plane, recuperates at Cleveland's Museum of Natural History. Inhabitants of Canada's arctic regions, the owls fly south in harsh winters.

Seal Harvesting Ban Sought

WASHINGTON, June 7 (UPI)—Commerce Secretary Peter G. Peterson said today that the United States would seek to ban fur seal harvesting on St. George Island, one of the two main Pribilof Islands in order to carry out research on seal populations.

Dog-Sledding Gains Status

JUNEAU, Alaska (AP)—Dog-sledding has become the official sport of Alaska under a law passed this year and signed by Gov. William A. Egan.

Pipeline Concerns In $30-Million Pact For Arctic Drilling

By EDWARD COWAN
The New York Times

TORONTO, Feb. 1—Three major United States pipeline companies, hungry for future supplies of natural gas, have committed themselves to spend at least $30-million on exploratory drilling on Canada's Arctic islands.

The agreement is with Dome Petroleum, Ltd., which will do the drilling.

The commitment, announced today in Houston and Calgary, Alberta, was given by the Consolidated Gas Supply Corporation, a subsidiary of the Consolidated Natural Gas Company; the Panhandle Eastern Pipeline Company and Texas Gas Exploration, Ltd., an affiliate of the Texas Gas Transmission Corporation.

In another development relating to fuel from the Canadian Arctic, Imperial Oil, Ltd., Canada's biggest oil company, released hitherto secret technical data on the discovery well it put down in January, 1970, at Atkinson Point, Northwest Territories, near the northern edge of the continent.

One analyst described the data as "mouth-watering for an oil geologist," although he hastened to add that they confirmed earlier impressions that the well itself didn't look like a major producer.

The information confirmed, the analyst said, that the area known as the Beaufort Basin "will be a major hydrocarbon province in world terms."

The Beaufort Basin includes both the mainland and the Continental Shelf. Imperial is a subsidiary of the Standard Oil Company (New Jersey).

The three companies that will finance Dome's drilling in the Arctic islands, about 800 miles north of the Arctic Circle, were given a "competitive call" on 75 per cent of any gas discovery. In other words, Dome must sell three-fourths of the gas to the companies provided they are prepared to pay as much as any other bidder, a Dome spokesman explained.

The transborder financing arrangement announced today is like several that have already been disclosed, and others are expected. Dome's three partners must come through with the $30-million over five years and have the option to spend as much again with Dome over a second five-year period.

world of ice

by JOSEPH M. DUKERT

It is the highest, driest, coldest, and emptiest continent on earth. There is virtually no vegetation and no native population except for penguins, seals, and some hardy seabirds. It encompasses a land area bigger than the United States and Mexico combined, 95 per cent of which is covered with snow and ice that in some places is three miles thick. This is Antarctica, site of some of the most fascinating and significant scientific research going on anywhere in the world—and the latest in attractions for adventurous and well-heeled tourists.

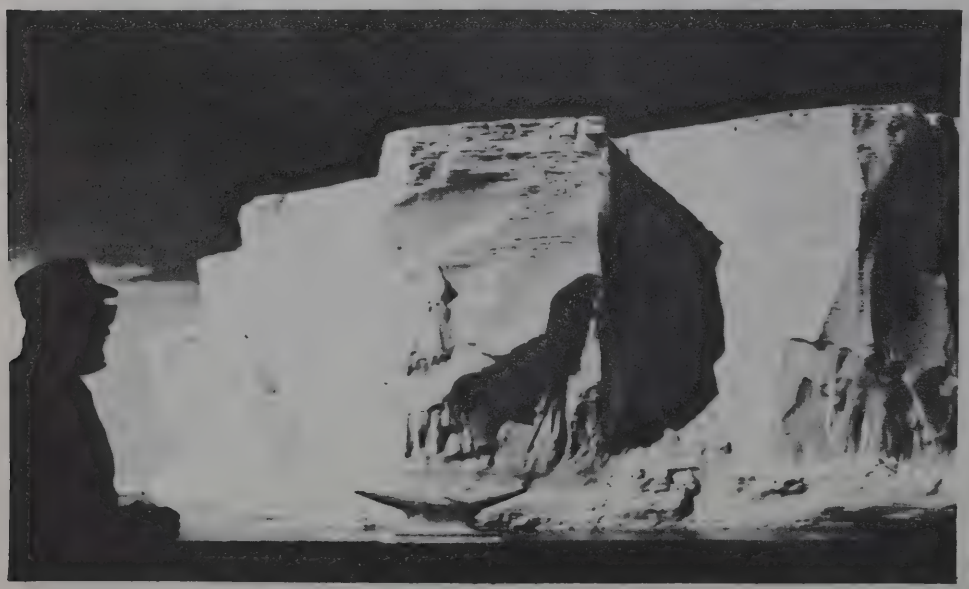
I recently revisited Antarctica—I had been there ten years ago—with a group that included several other journalists. We had been invited to "the bottom of the world" by the U.S. government as part of a program designed to increase awareness and understanding of the international scientific work being undertaken there. We arrived by air at McMurdo Station, on the edge of Ross Island. McMurdo, known as the gateway to Antarctica, is one of four bases operated year round by the U.S. Navy in support of the research and scientific studies being conducted by the National Science Foundation. Our host was Rear Admiral David Fife Welch, in charge of the Navy's part of Operation Deep Freeze, the name given to American activities in Antarctica.

McMurdo is a metropolis by Antarctic standards. It has a summertime population of close to 1,000 scientific and Navy personnel, equal to that of the rest of Antarctica put together. Its sea-ice runways can accommodate big jets during most of the year, but our arrival coincided with an unusual warm spell so we flew in and out in ski-equipped C-130s. These turboprop planes land on snow atop the 100-foot-thick Ross Ice Shelf.

McMurdo Station was originally built for the research studies that were carried out during the International Geophysical Year of 1957–58. It is now undergoing its own form of urban renewal. The original wood and canvas huts have been replaced by two-story buildings of galvanized metal over riveted steel. The dirt streets are smoother now, and caterpillar-treaded Weasels have given way to conventional trucks. There is a new modern hospital.

One thing hasn't changed very much at McMurdo: the water shortage. In an environment where the natural form of water is ice, the liquid version is hard to come by. The station's small nuclear power plant can desalt 14,000 gallons of seawater daily, but even with help from diesel-fueled apparatus, that is not enough to meet the requirements of this frontier community.

Over several summer seasons, Seabees built bulk storage tanks at McMurdo which hold 8.6 million gallons of various types of fuel. Once each year, as soon as the bay is cleared of accumulated ice, the U.S.N.S. *Maumee,* a 620-foot tanker with a reinforced bow, noses up the deep channel to discharge its cargo at a natural ice pier. The *Maumee,* operated by the Military Sealift Command, carries more than 5 million gallons of fuel, all of it supplied by Esso International, a Jersey Standard affiliate. A typical cargo may include 2 million gallons of Arctic-grade diesel oil and 2.5 million gallons of jet fuel, used by the C-130s on their supply flights to inland stations. The rest is divided among "avgas," for piston-engine helicopters; "mogas," for trucks and tractors; and marine diesel fuel for icebreakers assigned to Antarctic waters.



Approaching ships must pick a path through the icebergs.

From McMurdo we flew 800 miles to the South Pole Station, hard by the geographic pole at the southern end of the axis of the earth's rotation. The landing strip of compacted snow was just as Admiral Welch had described it back in McMurdo: "14,000 feet long, with 2,000 miles of overrun... miles and miles of nothing, but nothing."

The brightly colored science shacks and prefabricated living quarters which the Navy had delivered to the station by airdrop fifteen years ago have disappeared under drifting snow, except for the radio masts and the new entrance structures that mark the buried base's location.

The official name of the base is the Amundsen-Scott South Pole Station, after the first two explorers to reach this point across the Antarctic wastes. Norwegian Roald Amundsen won the grueling race to the South Pole on December 14, 1911. Captain Robert Falcon Scott, an Englishman, arrived thirty-five days later. Scott's entire group perished of starvation and exposure on the trek back to the coast.

It was quite comfortable by South Pole standards when we disembarked from the plane—only 24 degrees below zero. The norm for the area is minus 55 degrees, and winter temperatures have plunged to more than 113 degrees below.

We left the dazzling sunlight of the polar plateau and began our visit to the scientific station below. South Pole Station is crowded but not uncomfortable. Next year the Navy will begin installing a huge, aluminum geodesic dome on top of the snow—big enough to shelter several new buildings. But in the meantime the snow-covered prefabs and dimly lighted connecting walkways are sixty feet down.

Some of the scientists we met below were looking still farther down—beneath the bedrock of the continent. They listen

for earth tremors in the Northern Hemisphere, right through the core of the earth. It's one way to do research on the composition of the core. Antarctica is a good seismic listening post for quakes in the Southern Hemisphere as well. A worldwide network of such stations will some day be able to predict earth movements.

Dr. Bernard V. Jackson of the University of California was our host at dinner under the polar icecap. "Because of our position right on the axis," he said, "the earth rings like a bell down here for a couple of days after a big quake."

As station scientific leader, Dr. Jackson is responsible for all the research work at the South Pole base, including seismology, although his personal studies are in high-altitude physics. In this field, too, Antarctica's location lends itself to rewarding research. The lines of magnetic force around the earth trap cosmic particles and send them streaming down toward one end of the globe or the other. The natural bombardment from outer space causes frequent communications blackouts in Antarctica. It's an ideal place to do research on these disruptions.

Unlike the North Pole in the Arctic Ocean, the South Pole rests on a continent that offers a solid platform from which to make continuous scientific observations. Indeed, all of Antarctica could be considered a clean outdoor laboratory, with the rocks, ice, and meager wildlife almost untouched over the millenia. It is a place where Nature goes to extremes: pools of molten lava in at least one active volcano; wind gusts in the winter of up to 200 miles an hour; mysterious, snow-free, dusty valleys near the coast which are so much like the hostile environment of Mars that the National Aeronautics and Space Administration has used them in developing extraterrestrial life detection systems. Encompassing 95 per cent of the world's permanent ice, Antarctica is the highest of all the continents, with an average elevation of 7,500 feet. And yet, except for some coastal areas, the continent is actually a desert.

It is little wonder that research activities in Antarctica have expanded to include dozens of different scientific disciplines. There one finds biologists, cartographers, geologists, glaciologists, meteorologists, oceanographers, physicists, and climatologists. Increasingly, the results of their varied studies interlock. For example, climatologists get evidence from the other sciences about long-term trends in Antarctica. The evidence is useful in developing a more thorough understanding of how and why the "worldwide weather machine" works as it does. That, in turn, could lead to reliable long-range weather predictions for all areas and, eventually, to climate control.

Sailors remove ice from the superstructure of USS *Burton Island* after an Antarctic storm.

But Antarctica is more than a storehouse of scientific data. It is one of the most beautiful areas in the world. Even the snow has color; shifting sun-angles on the crystalline surface turn it pink and purple and gold. The relative flatness of the polar plateau is broken by soaring mountain peaks, and there are magnificent ice-rivers and ice-falls.

The day after our trip to the Pole, we watched the *Lindblad Explorer* dock at McMurdo with 100 passengers aboard. Lindblad Travel of New York has been running ship tours to the edges of Antarctica for the past five years. The *Explorer* is a 2,480-ton vessel; 250 feet long, and specially reinforced for moving through icy waters.

At McMurdo, Admiral Welch assigned a Navy guide to each group of five tourists from the *Explorer*. It was a routine precaution. The Antarctic is no place for a novice to wander off by himself. Not long ago a Norwegian visitor to the McMurdo area strayed thirty feet from his party and fell into a ten-foot-deep crevasse.

There have been about twenty tourist cruises to the Antarctic so far, dating back to the late nineteen fifties when the Argentine Navy began to carry paying passengers to some of the northernmost points. Tourism to the southernmost continent is likely to increase, but it will be limited both by the chronically severe weather and by the cost of getting there.

Besides its natural beauty and wealth of scientific lore, Antarctica has another distinction. It is one area of the world where total disarmament prevails and international cooperation is the order of the day. The Antarctic Treaty of 1961, signed or acceded to by sixteen nations including the United States and the Soviet Union, declares: "It is in the interest of all mankind that Antarctica be used exclusively for peaceful purposes and shall not become the scene or object of international discord."

The multination, multidiscipline effort in Antarctica has already taught us a lot about our planet. The success of the Antarctic Treaty may teach us all something about how to get along together.■

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Huge Siberian Gas Field Opens

By THEODORE SHABAD
The New York Times

MOSCOW, April 22—The Soviet Union announced today the start of production in a gigantic and remote Siberian gas field.

Izvestia, the Government newspaper, reported that natural gas had begun to flow from the Medvezhye field, astride the Arctic Circle, where the Russians have been battling a harsh northern environment to help solve the growing energy shortage in the industrial centers of European Russia.

The Siberian gas resources are so enormous that aside from meeting Soviet domestic needs and export commitments to Western Europe, they may someday — perhaps in the nineteen-eighties—help to fuel industry and to heat homes on the Eastern Seaboard of the United States.

The prospects of shipping liquefied natural gas from Medvezhye and other nearby deposits to the American East Coast were discussed here last November when Maurice H. Stans, then Secretary of Commerce, reviewed trade potentialities with Soviet officials.

Two major Texas-based natural gas suppliers, Texas Eastern Transmission Corporation and Tenneco Inc., both of Houston, were later reported to have sent teams of specialists to the Soviet Union to investigate the feasibility of a liquefied natural gas deal.

A recent study by National Economic Research Associates, a New York consulting company, suggested that such a project deserved serious consideration in view of the Soviet Union's huge gas resources provided its gas could be delivered to the East Coast at competitive prices.

The Soviet Union's natural gas reserves, now put officially at 630 trillion cubic feet, are more than double those of the United States. The giant Siberian fields alone are equivalent to the American reserves.

Against the background of the wide interest in the Siberian gas field, its start of operations was reported in Izvestia in a 100-word item that did not reflect the vast potential and implications of the event.

"It took the construction workers a record time — three months instead of two years — to complete installation of the first gas recovery plant," Izvestia reported from Nadym, the pioneer city near the field.

"Work had to be carried on under conditions of permanently frozen ground," the paper said. "The builders have now delivered their warranty certificate to the gas workers. Commercial operation of the Medvezhye gas deposit has begun."

Pending completion of the first pipeline, now in its final stages, gas from the Medvezhye field will be used to fill the pipeline segments already completed. By the end of the current five-year plan, in 1975, Medvezhye is scheduled to be producing at the rate of more than 1.3 trillion cubic feet a year. Its total proved reserves are more than 50 trillion cubic feet.

The first pipeline, ultimately to be expanded into a system of lines to move the huge amounts of gas, consists of two segments of different diameters.

A section linking Medvezhye with the central gas-collecting center of Nadym uses 56-inch pipe in which the gas will be transported at pressures of 1,100 pounds per square inch. A longer section, built of 48-inch pipe with transporting pressures of 800 pounds per square inch runs from Nadym southwest to link up with the present pipeline terminal at Kazym.

Medvezhye gas will thus feed into an existing pipeline system serving the industrial region of the Urals, which also suffers from a shortage of energy, requiring expensive long rail hauls of coal from Siberia.

Over the next few years the Siberian pipeline is to be extended through Nizhnyaya Tura westward to Perm, Kazan, Gorky and on to the Moscow area. Ultimately Siberia's gas will be flowing to Western Europe under delivery commitments already concluded by the Russians with West Germany, France and Italy for the second half of the seventies.

The New York Times/April 23, 1972

Natural gas has begun to flow from Medvezhye (cross)

Soviet Reports Drilling For Oil on Arctic Island

The New York Times

MOSCOW, March 6—Soviet oilmen, pressing ever farther into the polar regions, reported today that they had started an exploration well on an island in the Arctic Ocean in the hope of tapping reputedly huge petroleum resources under the continental shelf off the Soviet Union's north coast.

The well is being drilled under the harsh environmental conditions of an Arctic winter on Kolguyev Island in the Barents Sea, 375 miles northeast from the White Sea port of Archangel.

According to an account of the Arctic experiment in Izvestia, the Soviet Government newspaper, it took half a year, instead of the predicted two months, just to transport and install drilling gear and other equipment on the prospective oil site.

Drilling of the well is expected to take a year before the suspected oil-bearing rocks are reached at a depth of 6,000 to 7,000 feet. But Soviet geologists are understood to be confident that the effort will ultimately pay off.

The concentrated oil exploration effort in the Arctic Ocean off northern European Russia is based on two factors.

The New York Times/March 7, 1972

One is the prediction, advanced by some oil experts, that the continental shelf of the Arctic Basin may contain huge oil resources. Some say as much as half the world's reserves.

The other driving force has been the reluctance of Soviet economic planners to depend on oil resources now being developed in Siberia, far from the population centers and markets of European Russia.

The problems of resource development in the hostile Siberian environment and of attracting labor to its harsh climate have stimulated the present effort to find oil and other mineral reserves in European Russia, closer to the economic heart of the nation.

On Kolguyev Island, which is believed to be an extension of oil-bearing structures on the nearby mainland, the oil exploration party has set up camp next to the hunters' and reindeer herders' settlement of Bugrino, on the island's south coast. Covered with treeless tundra and fogbound much of the year, the desolate island is otherwise virtually uninhabited.

Most of the Soviet Union's oil is now being derived from fields on the mainland, notably in the Urals-Volga region and in western Siberia around Surgut. Offshore production has been limited to the Caspian Sea.

New Deal on Seals

Washington, Feb. 1 (AP)—The State Department says major improvements will be sought in a proposed Antarctic seal treaty when international talks begin in London Thursday. Ambassador Donald McKernan said the proposed changes are "introduction of a ban on pelagic sealing; the restriction of sealing methods to those which are humane; and the creation of a committee to oversee the workings" of the treaty.

Record of a Little Ice Age Is Discovered

By WALTER SULLIVAN
The New York Times

Feb. 5—From a study of ice extracted from deep within the Greenland ice sheet it appears that 89,500 years ago something catastrophic changed the climate from being warmer than today's to that of a full-fledged ice age.

From cores of bottom sediment hauled up from the floor of the Gulf of Mexico it has likewise been concluded that, almost at the same time, an abrupt change of climate wiped out the warm-water life of that sea. The Gulf then remained relatively barren until cold water species began to appear about seven centuries later.

These and other findings bearing on what may cause ice ages were reported last week at an international gathering of scientists at Brown University in Providence, R. I.

It was reported that the Greenland drop in temperature "might have occurred almost instantaneously." For some reason it did not set in motion a prolonged ice age and within about 1,000 years the climate returned to its previous warmth.

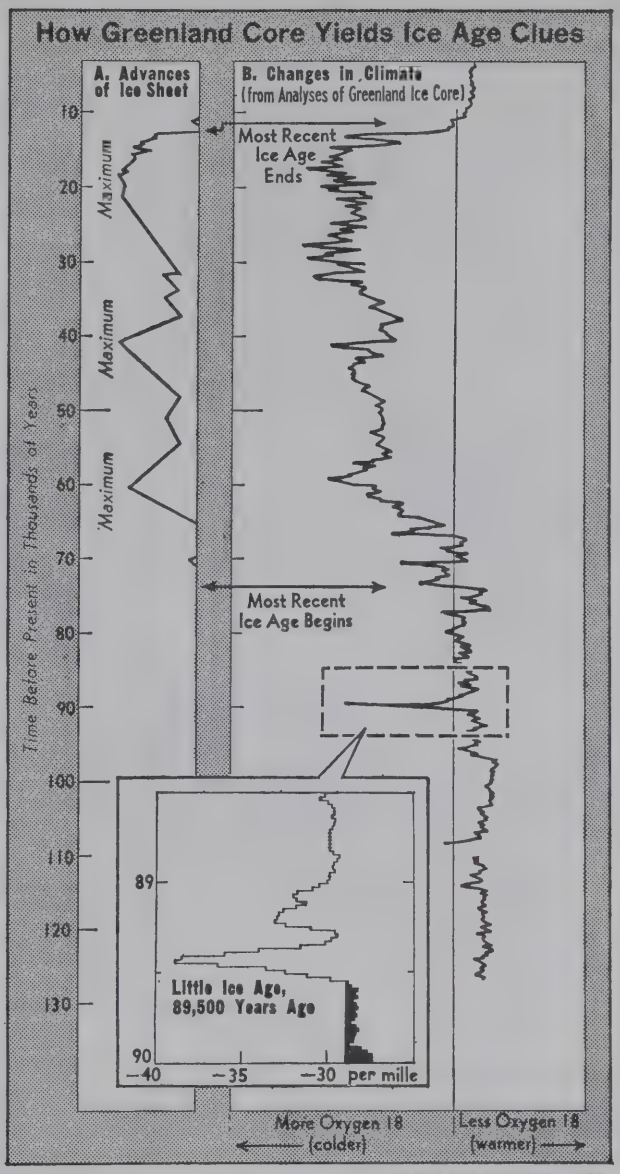
It was not until 73,000 years ago, according to the climate record locked within the Greenland ice, that the last, or Wisconsin, ice age got under way. That ice age ended about 12,000 years ago.

No agreed explanation for such changes emerged from the meeting but the conferees were of one mind in assessing the present world climate as transitory. Dr. Cesare Emiliani of the University of Florida, dean of those who have studied oceanic sediments to reconstruct timetables of past climate change, said that for only 2 or 3 per cent of the last 400,000 years has the world been as warm as it is today.

It was noted in a final statement of the conference that the last 10,000 years of warm climate had made possible the flowering of human culture and the rise of modern civilizations. And it was argued that climatic fluctuations may have had more immediate effects, such as the downfall of Nikita S. Khrushchev as Soviet Premier.

His virgin lands program of northern agricultural development might have succeeded, it was said, had not a cyclic climate change caused its failure.

There was wide agreement that a new ice age could come within 2,000 or 3,000 years—or sooner, if pollution of the atmosphere tips the scales in an already unstable climatic condition.



The New York Times/Feb. 5, 1972

Through analysis of oxygen in ice extracted from bore hole in Greenland ice sheet, climate changes over last 125,000 years have been reconstructed. The colder the climate, the more falling snow is enriched in heavy form of oxygen (oxygen 18). Column B shows climate changes deduced from the oxygen analysis. Column A shows successive advances of the North American ice sheet.

However, it was agreed that too little was known of the role of pollution to make any predictions. A major purpose of the meeting was to prepare the ground—and encourage financial support—for a more intensive study of the factors determining climate changes, past, present and future.

The most dramatic, and controversial, explanation for the abrupt cooling of climate was that of Dr. John T. Hollin of the University of Maine. He contends that the Antarctic ice sheet periodically breaks loose and slips into the sea, raising worldwide sea levels abruptly and covering much of the southern oceans with ice. This would chill the entire atmosphere and set in motion a new ice age, he believes.

The slippages occur, according to his hypothesis, when the ice becomes thick enough to impede the escape of heat from the earth beneath it so that the floor of the ice sheet melts, enabling the ice sheet to slip into the sea on the slushy bottom layer. The ice sheet now averages more than a mile in thickness.

Less than half would probably break loose, Dr. Hollin believes, but this would still be enough to raise all the oceans 60 feet.

The Greenland ice studies were reported in a paper submitted by three scientists from the University of Copenhagen and C. C. Langway of the Army's Cold Regions Research and Engineering Laboratory in Hanover, N.H.

The Gulf of Mexico results were reported by James P. Kennett of the University of Rhode Island.

Russians Pay Fishing Fines

Anchorage, Alaska, Feb. 17 (AP)—A United States attorney in Anchorage said today that the Soviet government has paid $80,000 in fines and $170,000 in an out-of-court settlement in the Soviet ship seizure case.

The payment allows three herring fleet officers and their two ships to leave Alaska one month to the day after they were seized in the Bering Sea.

U.S. Attorney G. Kent Edwards said the fines had been paid by the Soviet government to the Justice Department in Washington, D.C.

A U.S. District Court judge fined the three officers a total of $80,000 yesterday when the three changed their pleas from innocent to no contest on charges of conducting illegal fishing support activities near St. Matthew Island in the Bering Sea.

A separate out-of-court settlement of $170,000 was announced in a civil case against the two ships, the 362-foot factory ship Lamut and the stern trawler Kolyvan.

The two ships were seized by a Coast Guard icebreaker Jan. 17 about nine miles from an uninhabited island some 200 miles off the Alaskan coast. They were accused of transferring supplies within the U.S. 12-mile limit in violation of a federal law enacted in 1968.

Reindeer Grant in Alaska

NOME, Alaska (UPI)—A Federal grant of $40,000 has been awarded to help pay for management of the reindeer herd on Alaska's Seward Peninsula. The grant was from the Bureau of Indian Affairs.

Garbage Grows With Base

TOKYO (AP) — As the Japanese Antarctic base on Ongul Island grows and life there becomes more convenient, garbage disposal is becoming a problem, a returning official reported.

'Magnetic Racetrack' Floats Above Earth

By Alton Blakeslee

McMURDO STATION, Antarctica (AP) —Thousands of miles above the earth floats an astonishing magnetic racetrack.

Because of it, a flash of lightning in the United States can be heard as a loud "whistle" down here around the South Pole.

The racetrack phenomenon may in time provide a new system of radio communication that would not be blacked out by storms on the sun, as can happen now.

The racetrack permits instruments here to listen in on Morse code radio transmissions, at very low frequencies, of the U. S. Navy and military forces of other nations. The dashes and dots for words can be understood, but not the meaning encased in secret codes.

And because this magnetic racetrack demands more intensive study, a couple of young graduate students will become full-fledgel Antarctic commuters.

After breakfast during the six-month long winter of total darkness, with temperatures sometimes dipping to 60 below zero, one or both budding young scientists will follow handlines staked out along a half-mile trail from their main base to their isolated "office" of an instrumented hut to start their day's work.

They may return for lunch, come "home" for dinner and likely go out again at night for more observations relating the brilliant southern lights of Aurora Australis to what's happening along the racetrack.

There are personal rewards in this brutal climate, says John Katsufrakis, a tall black-bearded scientist who has spent many months in Antarctica.

"This daily commuting makes man an intimate witness of the aurora, of moonlit landscapes, of the splashes of brilliant colors from the sun hovering just below the horizon. Men conquer the fury of cold and wind on their daily trek to work. Somehow the totality of this involvement with nature gifts them with an awareness and tranquility that makes the long winter a unique and rewarding experience."

Katsufrakis, a senior research engineer at Stanford University, is program coordinator for the new Siple Station being erected 800 miles northeast of the South Pole in the continuing studies of the U. S. Antarctica Research Program conducted by the National Science Foundation. The U. S. Navy runs the supply, construction and maintenance of stations or bases.

At Siple Station, scientists are constructing an antenna that will stretch 13 miles, set 15 feet above the surface of an icecap 8,000 feet deep. A tower 71 feet tall is connected with the system. That height will allow the station to keep operating for at least 10 years.

The antenna is 3,000 feet from the Siple Station where four to five men will live all winter. The separation is needed to avoid interference from electrical power lines at the home base, Katsufrakis said.

Hence the graduate students, not yet chosen, will become daily commuters. Siple Station is expected to begin winter operations in 1972, with two to three scientists, a mechanic and a physician. It's hoped a Soviet exchange scientist might be the third member that year of the research team, Katsufrakis said.

The story of the magnetic racetrack begins wtih the ionosphere, a layer of electrified particles that acts like a mirror to bounce radio waves back and forth from the earth's surface so that on repeated bounces or hops they can go around the world.

But magnetic storms on the sun send out streams of particles that break up the mirror, causing radio static or blackouts. When a flash of lightning occurs, about 10 per cent of that energy penetrates through the ionosphere, which hovers 40 miles or more above the earth's surface.

There the energy is pulled into the "racetrack," a magnetic line of force ballooning out from the earth, like half an oval racetrack, as far as 26,000 miles out in space.

The wave of energy then comes zipping back through the ionosphere at the other end of the track, and can be heard on special receivers as a loud whistling sound of descending tone. At one Antarctic station, up to 150 whistlers a minute were heard when electrical storms were clouting the Northern Hemisphere in June, July and August.

Antarctic studies have found that collisions can occur along the outer part of racetrack between the lightning flash energy and electrons trapped in the boundary zone so that the keep zipping back and forth along the oval track.

When the wave and electron collide, a new and complex very low frequency signal is generated, and most significantly, this signal is 10,000 times stronger than the original energy coming onto the track from the lightning flash.

In the collision, the speeding electron gives up much of its energy to the wave, and also creates some X-rays (which do not reach human life) and the electron the falls down into the ionosphere.

When a solar storm flares up, the boundary line, known as the plasmapause, can be pushed far closer to earth. But this only increases the strength of the signals being carried and amplified along it, while the ionosphere is being blacked out for signals.

Thus the ultimate hope is to use the racetrack for sure and strong signals of communication at all times.

The big discovery, says Katsufrakis, is that man-made signals can be used from conjugate points — points at exact opposite places on the earth — to travel along the racetrack for controlled studies of the phenomenom under varying frequencies and signal strengths.

The opposite part of the world for Siple Station is Roberval in a quiet Canadian forest preserve 125 miles north of Quebec City. Canadians and Americans are cooperating and sending and receiving signals exploring the plasmapause, and so are the Soviets, French and New Zealanders, all signatories to the Antarctic treaty pledging use of this great continent only to peaceful and scientific purposes.

Team Performs Heart Studies On Penguins

SEATTLE, Wash. (UPI)— Three University of Washington scientists are analyzing the results of an unusual study of the chemistry and circulation of the blood of Antarctic penguins and petrels.

The three participated in an expedition sponsored by the National Science Foundation over a three-month period at Palmer Station on Anvers Island, about 700 miles from the South Pole.

The expedition was partly financed by the American Heart Association and its local affiliate, the Washington State Heart Association. These organizations figured that knowledge obtained from penguins and petrels might eventually be adapted to studies of heart ailments in humans.

One phase of the research involved an investigation of cardiovascular adjustments during exercise.

To obtain this data, Penguins were outfitted with vests carrying instrument packs. Electrodes and catheters, implanted in the arteries and veins of the flightless birds, sent signals to monitoring equipment on its back while the birds walked around on the ice.

These signals, in turn, were transmitted by radio telemetry to a portable receiving set, where the sounds were recorded on tape. Later, the tape was fed through instruments that translated the sounds into recordings on graphs.

Other data obtained while the penguins were swimming and diving was relayed to an instrument pack placed on a small styrofoam raft. A 120-foot wire, connecting the bird with a transmitter, enabled a peguin to exercise freely while the readings were being taken.

Tests also were made to determine how the Anarctic birds keep their bare feet warm while walking on ice. It was found that they did this by vasodilitation—the ability to contract and expand blood vessels and thus regulate the blood flow to the feet.

The three Scientists participating in the study are Dr. Kjell Johansen, professor of zoophysiology, Dr. Ron Millard, a postdoctoral fellow in physiology and biophysics, and Bill Milson, a graduate student in zoology

ANTARCTICA BASE FIGHTS POLLUTION

Incinerator and a Treatment Plant to Aid Campaign

McMURDO STATION, Antarctica, Jan. 1 (AP)—Where man goes, man pollutes, and this pristine continent has not escaped the consequences of human exploration.

But an antipollution conscience is now greatly diminishing the damage that man has done to his environment here.

For 14 years at this United States base in Antarctica, trash, garbage, beer cans, plastic containers, old tires and abandoned machinery have been floated out to sea on melting ice floes, soon to sink to the bottom of McMurdo Sound. In places, divers report, the seabed is becoming a highway of litter that crowds sponses out of living space.

For 14 years, raw sewage has been piped into the Sound, by the shoreline of Ross Island.

This summer season, a $175,000 incinerator capable of burning 600 pounds of material an hour is going into action. And next summer, a sewage treatment plant, costing $225,000 and using chemicals and bacteria, is expected to make sewage sterile for later disposition into the Sound.

McMurado Station is on land that lies free of snow in summer (when it is winter in the United States] so landfill sites are being sought for compacted pacted cans and other nonburnable trash.

Field parties going into the snow-free dry valleys 60 miles from McMurdo are equipped to bring back all their trash, garbage and body wastes to keep those areas free of contamination. The measure follows some years of disregard concerning such waste disposal.

Studies are under way concerning the possibility of putting minisewage - treatment plants or disposal plants at such places as the South Pole Station, 800 miles to the north, where sewage is now piped out, to sink into the snow and ice two miles thick. Thousands of years from now, the movement of the ice will deposit it in the seas.

There are those who say that man-made pollution is of no great consequence here, because man occupies only a few areas of the 5.5-million-square-mile continent. They say that penguins contribute much more waste.

One biologist has estimated that a single large sperm whale excretes as much body waste in five months as do 1,000 men who live and work here at McMurdo in the five spring-summer months.

Conservationists and ecologists reply that man can do something to reduce the impact of his waste, while animals cannot, and that penguins do not drink beer and throw away the cans.

Further, they say, discarded paper and clothing, much less cans and plastics, may last for many years in cold waters. Ecologists also worry about the effects of increasing tourism, limited so far to shipborne visits to places like this, in terms of litter and sewage and possible disturbance of penguin rookeries.

Plans for the McMurdo incinerator and sewage plants were started about three years ago by the United States Navy, which is responsible for supply, construction and maintenance of the half-dozen United States Antarctic bases. A year ago, the National Science Foundation, which has sponsored scientific studies since 1957, was given over-all charge of the entire United States operation.

While actions are being initiated to control some sources of man-man pollution, there are others beyond control. DDT and other pesticides have been found in penguins and other animals here, and scientists are finding and wondering about the effects of traces of lead, copper, iron, aluminum and other metals borne, like the pesticides, on the winds from distant civilization.

BACK PACKIN' PENGUIN — Seemingly equipped for a wilderness excursion, a penguin waddled across the ice at Palmer Station, Antarctica, about 700 miles from the South Pole. The bird had been fitted with a radio device designed to transmit cardiovascular information to University of Washington scientists studying the creatures.

Cold-Weather House Built

LENINGRAD (AP)—A house with bulging sides like a football's has been designed for northern regions, reports Tass, the official Soviet press agency. It is cheaper to build and retains heat better than conventional structures, Tass said.

Prof Gets a Whale of Job

Aug. 1

The International Whaling Commission, composed of 14 nations, will have as its chairman a professor at the State University at Stony Brook.

Dr. John L. McHugh, professor of marine resourses, will serve a three-year term as chairman. He has been U.S. representative to Whaling Commission since 1961 and has served as vice-chairman for the past three years.

McHugh associated with Stony Brook since last September, is also a member of the university's Marine Sciences Research Center. He is spending the summer in Washington on a Woodrow Wilson fellowship, studying North Atlantic fisheries.

The International Whaling Commission advises member governments on whaling quotas, with the aim of preserving existing whale stocks and building up their species.

The Russians and the Japanese now dominate world whaling, said McHugh. The U.S., which, in the mid-19th century sent out hundreds of whalers, is now reduced to a single whaling company in California. With virtually no whaling industry left, the U.S. imports 30% of the world whale products, mostly from Japan and Peru.

Whales are used mostly for cat food and as an oil base for numerous products such as soap, margarine, beauty creams and transmission fluid.

McHugh was the former head of the International Decade of 1970 Ocean Exploration office of the National Science Foundation in Washington.

From 1968 to 1970, he served as acting director of the Office of Marine Resources of the Department of the Interior and, from 1963 to 1968, he worked as deputy director and assistant director of the Bureau of Commercial Fisheries.

RCA Alaska Plans Station

RCA Alaska Communications, Inc., has filed an application with the Federal Communications Commission for permission to establish and operate a $1.2-million satellite communications earth station at Adak, Alaska. The earth station would be part of an overall program to use satellites to provide long distance communications service for the state.

Antifreeze Agent in Fish Blood Studied for Use With Humans

McMURDO STATION, Antarctica, Jan. 3 (AP)—Dr. Arthur L. DeVries would like to catch a codfish in the cold waters of the North Atlantic Ocean and give it a blood transfusion.

He would give it the blood of a codfish taken from the even colder waters of Antarctica to see if a peculiar "antifreeze" agent in its blood could keep the northern cod from freezing to death when placed in the water here.

The experiment would be one more step in pinning down facts about the fishy antifreeze material, which one day could have very practical human applications.

One possibility is that the antifreeze, made synthetically in large amounts, could make it possible to preserve human blood for transfusions far longer than is possible now, by keeping it almost frozen.

It might help biologists to find antifreeze materials in plants, then to select and breed those strains having the most antifreeze and thus the ability to withstand unexpected frosts and freezes that take an immense toll of fruits and other crops.

For scientists it might explain some remaining puzzles about the structure of water and ice and the structure of vital life molecules composed of complex combinations of sugars and proteins.

Dr. DeVries, 34 years old, has spent two winters and three summers in Antarctica, and one summer up north in the Arctic. He is with the Scripps Institution of Oceanography in La Jolla, Calif.

Dr. DeVries began research in 1965 to determine why Antarctic fish do not freeze when sea water freezes at 28 degrees Fahrenheit and nonsalt water freezes at 32 degrees.

Separating fish blood into its components, he found the antifreeze material. The temperature has to drop a fraction of a degree below 28 degrees before the blood will freeze. Fish living in the coldest water, right under the eight-foot thick ice of McMurdo Sound, have more of the agent than fish at 1,500 foot depth where the water is warmer, he found.

A black perch taken off the California coast and placed in McMurdo Sound froze almost immediately. A man would die in five minutes in these waters.

Dr. DeVries has identified the antifreeze substance as a glycoprotein, consisting of two amino acids of components of protein, and two forms of sugar.

A high salt content in fish blood will depress the blood freezing point, but the antifreeze material takes it lower. And the glycoprotein also exists in other fluids and tissues of the Antarctic cod. Cold seems to be a challenge for the fish to start producing the antifreeze.

Presumably Dr. DeVries says, North Atlantic cod have less of the antifreeze than fish here. Putting a northern cod into cold water here would not be a great shock to its metabolism or chemistry of life, as it would be for a warm water fish. And presumably blood from an Antarctic cod would be accepted by a northern cod without a transfusion reaction.

SUMMER SUPPORT ENDS FOR NAVY

March 1

The United States Navy would again have only three ski-equipped Hercules in its Antarctic support role next summer, said the commander of the support force (Rear-Admiral L. B. McCuddin) in Christchurch yesterday.

Although five new Hercules had been ordered the first was not likely to take its part in the programme until the summer of 1973-74, he said. In spite of only three being used this summer, 20 per cent more cargo was flown to inland stations.

The loss of a Hercules engaged in supporting a French traverse team in Wilkes Land was a serious set-back. However. there were no major injuries among the 200 scientists and about 2000 servicemen who took part in Antarctic activities this summer, said Admiral McCuddin.

He expressed satisfaction with construction projects at Siple and South Pole Stations. A new incinerator and sewage treatment plant had been built at McMurdo Station, but certain planned construction projects for this base were being delayed in view of possible recommendations of the Bechtel Corporation.

Among other things this organisation looked at during the summer was the possibility of moving the main American support station from its present location to Marble Point, 50 miles away, Admiral McCuddin said..

In view of this, the Navy planned that any new building projects for the McMurdo Station would probably be of portable construction.

Admiral McCuddin said he was in favour of such a move which would provide a year-round capability for wheeled aircraft in what was a virtually snow-free area.

"This means we could use the Starlifters, which in the event of bad weather in the area could at least overfly and return to Christchurch. The Hercules have to turn back at a certain point. It would be marvellous to have a year-round capability," he said.

Test spots of runway had been laid in the Marble Point area and from personal observation they were holding up well, he said.

If such a move was to take place the size of the support force would probably increase for several seasons while the transfer of locations took place.

However, to a question, Admiral McCuddin said it was also possible that the size of the Navy support force could be reduced should civilians be brought into the support role.

Admiral McCuddin said he didn't see how civilians could do the support job any better than the Navy.

The size and scope of next summer's work should be about the same as this summer although the Navy would try to achieve greater efficiency.

"As our budget is decreasing through devaluation and increasing costs, we will have to adopt new management procedures," he said.

Chopper Pilot Renowned For Skills in Antarctic

McMURDO STATION, Antarctic (AP) — Jim Brandau is called the most experienced helicopter pilot in Antarctica.

Specialists in Antarctic mapping acclaim his skill, as he nudges one helicopter skid against a mountain peak, the other hanging in air, while the topographers jump out and hug the ground with their bodies covering their equipment so Jim won't blow them off the peak when he lifts off.

He's logged more than 1,000 hours, and is renowned for what some say are deeds of flying derring-do.

Brandau, 38, a Navy lieutenant commander who grew op in Mason City, Iowa, is a former fighter pilot, and now is stationed at Quonset Point, R.I. He's attached to Operation Deepfreeze, the Navy program of support for scientific studies in Antarctica sponsored by the National Science Foundation.

It's Brandau's fifth summer —winter in the United States —down here.

This year's project is to map some of the dry valleys—where snow rarely falls and never collects—some 60 miles from McMurdo Sound, site of the main U.S. Antarctic base.

It was at the nouth of one dry valley, Wright Valley, two years ago last November, that Brandau's single helicopter engine quit siddenly. The rotors kept spinning from momentum and he was bringing the ship down, but it hit a mountain slope and tumbled down, catching fire and burning during most of a 600 yard slide.

Brandau, with no gloves on, tried to control the slide, suffering third-degree burns of the hands. When the aircraft stopped its plunge, only six of the eight men aboard could get out. Two died. Brandau spent five weeks in hospitals for treatment of his burns.

"Except for his skill, more people would have died," says Charles E. Morrison Jr., assistant chief of the mapping project.

$250,000 appeal for museum

CHRISTCHURCH, New Zealand, April 11

"I feel Christchurch is the Antarctic and mountaineering centre of New Zealand and perhaps of the world and it is very good that a section of the new wing will be devoted to the Antarctic and to mountains and mountaineering," he said.

"I believe this Antarctic centre will be a tremendous asset to Canterbury and New Zealand as a whole.

"I've been very impressed with what has been done. The next step is for the people of Canterbury and New Zealand to support this appeal."

Sir Edmund is president of the appeal for $250,000 to help meet the estimated $500,000 required to build and equip the wing.

The museum, he emphasised, would not just represent relics of the past but would also be active in today's Antarctic and mountaineering spheres.

The wildlife and fantastic beauty of the continent would be represented in the display.

It was here that a climate of opinion must be created to protect the beauty of the continent against exploitation, he said. The inspiration was needed for protection of the Antarctic at all costs.

"But the anniversary wing is not only for the Antarctic and mountains. It will enable the museum to handle the educational needs of our society in the future.

"It will not just be a dead repository of history but an exciting centre for education and recreation."

It was intended that the wing should be completed by 1973 so that it could make a magnificent contribution to the Commonwealth Games as well as to Christchurch, he said.

Sir Edmund confirmed his donation of equipment and clothes used on his Everest expedition and handed over his famed blue and white striped hat — made by his sister-in-law — to the director of the museum, Dr R. Duff.

At last night's opening function two cheques — $4500 from the Friends of the Museum and $400 from the Christchurch group of Young American Wives — were presented, bringing the total donations so far received or promised to $25,000.

About 600 people, including the United States Ambassador to New Zealand (Mr Franzheim), attended the function.

Sir Edmund Hillary and Dr Roger Duff, the director of the Canterbury Museum, at the launching of the appeal for funds to build a museum centennial wing.

QUOTAS REDUCED ON WHALE CATCH

International Body Agrees to Cutbacks for 1973

The New York Times

LONDON, June 30—The International Whaling Commission agreed today to reductions varying from 8 to 38 per cent in the 1973 quotas for catches of finback, sei and sperm whales in the North Pacific and Antarctic Oceans.

The reductions from present levels were announced after a weeklong meeting here of the 14-nation commission, which sets quotas annually. They were viewed as a hopeful trend by the United States delegation, whose proposals for a 10-year moratorium on whaling were rejected by the commission yesterday.

"We have achieved something less than a moratorium, but we are protecting the whales," Prof. Laurence McHugh, the commission's chairman said. The American professor estimated that the 1973 quotas would reduce next year's catch from about 40,000 to 34,000 whales.

"On balance, it's not been a bad week," said Russell E. Train, head of the 20-member United States delegation. Mr. Train, chairman of the Council on Environmental Quality, added: "Not only have the quotas been driven down, but progress has been achieved in many other directions, including common agreement on the need to strengthen the I.W.C."

Conservationists, who picketed the meetings of the commission, which were barred to the press, were disappointed with the quota announcement. "Even the most easy-going conservationist expected a complete ban on fin whale fishing," said Graham Searle, director of Friends of the Earth.

On the other hand, Dr. Lee M. Talbot, senior scientist with the Council on Environmental Quality and a member of the American delegation, said that "when seen in perspective the accomplishments of the conference were considerable."

In addition to the quota reductions, he said, the other main agreements are:

¶The Soviet Union and Japan, which account for more than 80 per cent of the world's whale catch, will allow international observers to check for excessive catches.

¶The commission will be strengthened through a permanent secretariat that will operate on an annual budget of about $100,000, compared with the present budget of about $12,000.

¶More study of whales and their habits will be financed, with the commission serving as a coordinator for the research.

After United States pressure, the commission agreed to limit the 1973 quota for fin whales in the North Pacific to 650, a 38 per cent reduction from this year's quota. The fin quota for the Antarctic was set at 1,950, a 34 per cent reduction.

The sei whale quota in the North Pacific was set at 3,000, a 20 per cent reduction, while in the Antartic it continued at 5,000, the same as last year.

The quota for the sperm whale in the North Pacific was cut 8 per cent to 10,000, of which 6,000 are to be males and 4,000 females. A similar male-to-female ratio was set for the sperm whale quota of 13,000 in the Antarctic, 1,000 below this year's level. Whalers favor catching the bigger males.

In other major decisions, the commission decided to maintain the ban on the hunting of the humpback and blue whales and extended it to the bowhead, right and gray whales.

Soviets Map Antarctic

LENINGRAD (AP) — Soviet scientists have drawn up new maps showing the Antarctic region without its ice cover, the news agency Tass reported.

RUSSIANS PRESS ANTARCTIC STUDY

More Than 100 on Winter Vigil at Six Stations

By JOHN NOBLE WILFORD
The New York Times

LENINGRAD, March 29—More than 100 Soviet scientists and technicians have begun a long winter vigil at six stations in Antarctica, one of which includes a new laboratory for research in polar medicine.

Other Soviet explorers, operating off a research ship, the OB, are scouting the Hobbs Coast for a suitable site for construction of a new permanent research station.

The Hobbs Coast area, which is in Marie Byrd Land about 1,000 miles from the main American research base at McMurdo Sound, has gone relatively unexplored. The new station would be constructed later this year, giving he Soviet Union six permanent bases ringing the Antarctic continent and one deep in its interior.

These and other developments in the Soviet Antarctic program were discussed in an interview with Dr. Aleksei F. Treshnikov, director of the Arctic and Antarctic Research Institute here in Leningrad.

The new medical laboratory is housed in a 20-room aluminum-and-glass structure at the main Soviet base at Molodezhnaya. Fifteen specialists in medicine and biology are members of the 17th Soviet Antarctic expedition.

The researchers at the medical center are expected to concentrate on studies of microbiology, hygiene and the acclimitization of polar explorers to their harsh surroundings. They want to learn what diseases occur most frequently and how they differ in a confined community and in such a climate.

Other investigations will involve the responses of human organisms, especially the circulatory, respiratory and sensory systems, to the extreme cold. Psychological studies of life in isolation will also be conducted.

"The Soviet Union being a northern country with Arctic populations of its own," Dr. Treshnikov said, "we think there is a very practical importance to all these studies."

In addition, Dr. Treshnikov said the medical work should help the institute define the physical and psychological requirements for further polar explorers.

Some of the most interesting data, he said, should come from the Vostok station, the Soviet base at the South Geomagnetic Pole, about 900 miles inland at an elevation of 11,000 feet.

Previous studies have shown such marked change among Vostok inhabitants as decreased blood pressure, increased red blood cell counts and various adjustments of the respiratory system to compensate for air that is half as dense as at sea level. About a dozen men are living at Vostok during this Antarctic winter.

But Dr. Treshnikov said that the primary emphasis of Soviet research in the Antarctic continues to be meteorological—the study of atmospheric processes and their interaction with the massive ice sheet and the ocean currents. Much of the earths weather is believed to be strongly influenced by the two polar regions.

Soviet scientists gather much of their data on upper atmospheric conditions from sounding rockets launched at the Molodezhnaya station.

Similar atmospheric observations are being conducted by Soviet and American scientists in the Arctic. The Soviet Union has two manned stations, outfitted with meteorological instruments, on drifting ice floes. A third one was abandoned a week ago because the floe was breaking apart.

About 20 automatic monitoring stations are also maintained. They are deployed and serviced every April and May.

The ultimate objective, Dr. Treshnikov said, is to take the data from Arctic and Antarctic stations and develop mathematical models of global atmospheric and ocean circulations. This should lead to considerably improved weather forecasting.

"The reliability of our present models is still very small," Dr. Treshnikov said. "The more we know, the more questions we have."

Soviet Ends Exploration Of an Area in Antarctica

By THEODORE SHABAD
The New York Times

MOSCOW, March 5—The Soviet Union has reported that its Antarctic scientists have completed a two-month exploration program of Mac Robertson Land, described as a region that has not been studied in depth.

Geologists, biologists and surveyors were said to have explored an area of about a hundred thousand square miles with the aid of light planes and helicopters.

Mac Robertson Land, situated between Long. 60 to 70 degrees E., lies in what has generally been regarded as the Australian sector of the Antarctic. The Australians have operated Mawson Station and other outposts in the area.

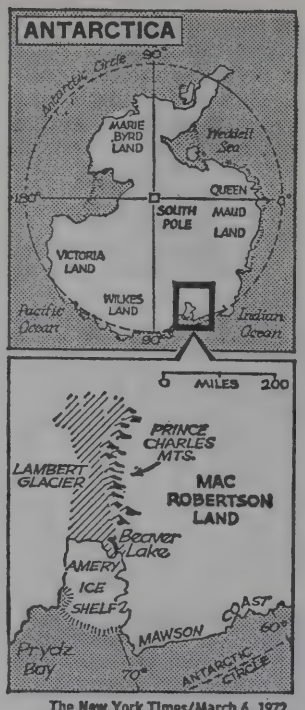
Soviet activities in the Antarctic have been pursued at an intensive rate over the years, with new expeditions being sent there every year.

Tass, the Soviet press agency, in reporting the recent Soviet activities, said the Russians had established their main base on the Amery ice shelf, one of the largest glaciers flowing from the Antarctic ice sheet into the Indian Ocean.

From their base, which was evidently maintained only for the two-month program during the Antarctic summer, scientists were airlifted deep into Antarctica.

Temporary field camps were established in the Commonwealth Mountains and in the Prince Charles Mountains to the north.

A camp was also set up on Beaver Lake, one of the few open bodies of water on the Antarctic continent.



The New York Times/March 6, 1972

The Soviet scientists worked in an area where Australians had previously carried out geological surveys uncovering some of the oldest rocks, dating from the Archean era, that have been identified in the Antarctic.

According to Tass, Soviet geologists continued the earlier surveys, locating a number of mineral deposits.

The deepest penetration by the Russians appears to have been Komsomolsky Peak, a 10,000-foot mountain jutting out of the ice cap 500 miles from the coast.

BOTANIST COLLECTS 290 SOVIET PLANTS

WASHINGTON, Jan. 8 (UPI)—Dr. John R. Creech, director of new crops research for the Agriculture Department, has returned home from two months in the Soviet Union with a collection of 290 plants, including some gathered on the first United States biological exploration of Siberia since the nineteen-thirties.

Dr. Creech's collection includes lilies, rhododendrons, junipers and birch grown in the frigid areas of Siberia, where temperatures sometimes reach 50 degrees below zero. Because the weather is so severe where these plants thrive naturally, Dr. Creech expects many of them to be useful in expanding the range to which American plants can be adapted.

Dr. Creech said Soviet botanists asked in return for seeds of plants found in the United States, primarily pines from the Southwest, cactus, maples and oaks. He added that these requests would be honored.

Scientists End Conference In Japan on the Bering Sea

HAKODATE, Japan, Feb. 5 (AP)—Fifty-two marine scientists from the United States, the Soviet Union, Canada and Japan ended the International Bering Sea Symposium here yesterday after agreeing to continue their studies of the mechanisms of the sea.

The five-day symposium was held in this northern Japanese city under the joint sponsorship of Hokkaido University and the University of Alaska.

The scientists said they still were puzzled that the Bering Sea provides rich salmon resources despite its geographical proximity to the North Pole.

To probe the mystery, the scientists said, they will continue to cooperate in studying the currents, the substances in the river waters flowing into the sea and other conditions in the region.

The Antarctic has him under its spell

Christchurch, New Zealand

"I was a goer in those days . . . I ripped in where angels feared to go. Posed as a reporter, once, to meet an explorer."

Speaking was Harold Griffiths, onetime president of the New Zealand Antarctic Society and now editor of "Antarctic," a quarterly journal (circ. 900) which goes to Russia, the United States and England as well as the icy continent itself.

Twice a visitor to Antarctica — by aircraft and by icebreaker — Mr Griffiths, 63, is now information officer for the Antarctic division of the Department of Scientific and Industrial Research, which has its headquarters in Christchurch.

His interest in the continent goes back half a century — when his essay on Antarctic exploration won a book prize.

Harold Griffiths was born in Dunedin on September 23, 1908 — the day the English explorer, Ernest Shackleton, started laying food depots for his trek to the South Pole.

"Three men went with Shackleton and they got to within 97 miles of the Pole when a shortage of food and atrocious weather made them turn back," Mr Griffiths recalled.

Mr Griffiths . . . an interest that spans half a century.

"When I was young I read lots about explorers. Today I've got about 150 books on Antarctica. The oldest are two volumes, published in 1847, by the Englishman, Ross.

"I paid about $6 for both books, getting them from a dealer in England. I suppose they'd be worth about $80 now.

"I've got Roald Amundsen's two volumes about his journey preparing for and reaching the Pole. One, picked up by a friend on the West Coast, cost $1 about eight years ago. The first volume, which I bought here, cost $3. Now I'd say they'd fetch $40.

"Amundsen has never had his just due. A lot of people say he was unsporting in making a race to the Pole with Scott.

"The city of my birth had quite a bit to do with Scott — he filled up with coal there in 1910. Shackleton called there, too. And the department of home science at Otago University, was called in to make up rations for Admiral Byrd's early expeditions.

"So in the 1930s I decided to set up an Antarctic society but Wellington started one first, in 1933, and Dunedin became a branch in 1936.

"In those days I posed as a journalist to meet the Australian Antarctic explorer, Sir Hubert Wilkins.

"I had a great talk with Sir Hubert who was soon drawing me maps of where he'd been.

"My firm, transferred me to Christchurch nearly 20 years ago and I started all over again, setting up another branch of the Antarctic Society.

"The Canterbury branch has got about 300 members and for the last two years I've been editor of the news bulletin.

"I've visited Scott's huts at Cape Royds and Cape Evans and it was like going back in time 50 years. The huts have a timeless atmosphere, as if the men had only gone for a day's trip.

"When I was in England, I went to the Scott Polar Research Institute, which has a wealth of diaries and letters just waiting for volunteers to work on.

"In fact I got so interested in dusty, fusty institutions over there, that I neglected my wife.

"I've got lots of interests besides Antarctica and try to do what Kipling wrote in 'If' — I try to fill every minute."

Soviet Selects Site for 7th Polar Base

The New York Times

MOSCOW, June 3 — The Soviet Union has announced that it has selected a site for its seventh permanent polar research station in the Antactic, extending its systematic exploration of the icy continent.

The new site, to be manned for the first time at the start of the Antarctic summer later this year, is on Cape Burks of Hobbs Cost, a part of western Antarctica that has gone relatively unexplored.

The site selection was made public Wednesday as the last supply ship, the Ob, departed from Antarctica with most of the summer personnel of the current Soviet expedition, leaving wintering crews totaling more than 100 scientists at the permanent stations.

This was the 17th annual expedition since intensive Soviet work in Antarctica began in 1955.

Over the years the Russians have been steadily expanding their activities, with five premanent bases now ringing the Antarctic continent and a sixth deep in the interior.

For the seventh station, the Ob scouted Hobbs Coast in recent months before deciding on Cape Burks for the new permanent site.

Hobbs Coast, which is part of the coast of Marie Byrd Land, was named in 1940 for Prof. William Hobbs of the University of Michigan, a glaciologist.

Among the wintering crews, the Ob left 17 scientists at the Leningradskaya station, established a little more than a year ago on Oates Coast. They will perform weather research and geophysical work during the winter season now closing in on the Antarcitic continent.

According to a review of Soviet activities made public by Tass, the official press agency, 400 Russian scientists worked in the Antarctic during the summer that has now ended.

Most of the work was concentrated in the Prince Charles Mountains in Mac-Robertson Land, where part of he Rocky foundations of the continent outcrop though the ice sheet.

In this area, about 250 miles from the cost, geologists have discovered beds of coal with petrified tree trunks and imprints of leaves that shed light on the tropical enironment believed to have existed in Antartic 250 million years ago.

ALASKA QUAKE FOUND TO HURT ANIMAL LIFE

WASHINGTON, Jan. 25 (AP) — The Alaska earthquake of 1964 had a cataclysmic effect on animal and plant life and caused devastating economic losses to the state's fishing industry, which may require several more years to recover fully, a report said today.

The report was by a special committee of the National Research Council.

A summary of the report by the council's Committee on the Alaska Earthquake said:

"Countless plants and animals were destroyed by major shifts on land and beneath the ocean and by tsunamis triggered by the quake. Long after the tremor, changes in habitat and the periodic tidal flooding of lowland lakes were still adversely affecting life in the area of Prince William Sound, where ecological damage was greatest.

"Damage to economically important fish and shellfish was extensive in Prince William Sound, where the immediate effects of the quake destroyed about 90 per cent of the mussels, 11 to 40 per cent of each species of clam of economic importance, thousands of large red rockfish and cod, and millions of salmon eggs and fingerlings."

New Zealand Seeks to Solve Waste Problems in Antarctic

CHRISTCHURCH, New Zealand, May 27 (Reuters)—New Zealand scientists living in the Antarctic are to try to solve their waste disposal problem with a special incinerator designed to minimize pollution in the frozen continent.

In the Antarctic the cold dry climate prevents any breaking-down of waste matter by biological or chemical action.

The Antarctic division of New Zealand's Department of Scientific and Industrial Research said the incinerator would be installed early next summer at Scott Base, on the edge of the Ross Sea. It is designed to burn everything except metal and should last for three years.

British Polar Explorers Honored

By DAVID LIDMAN Jan. 23

FOUR famed British explorers of the Arctic and the Antarctic are honored postally in a series of stamps to be released in Britain on Feb. 16. The men are Sir James Clark Ross, Sir Martin Frobisher, Henry Hudson and Robert Falcon Scott. The stamps will be multicolored, produced by photogravure by Harrison and Sons Ltd., the British stamp printers, from designs by Marjorie Saynor, who also designed two stamps in the 1970 General Anniversaries series.

James Clark Ross operated both in the Arctic and Antarctic making magnetic surveys and establishing the North magnetic pole. In Antarctica explorations, 1839-43, he discovered the sea named for him. His portrait on a 3-pence stamp is from a print at the Royal Geographical Society. The print is of an engraving by Henry Cook of a painting by J. R. Wildman (the latter is in the Greenwich National Maritime Museum). As background there is a map of the South Polar Sea (1841) which depicts the area of Ross's explorations between 1839 and 1843.

Martin Frobisher first entered the Arctic circle in 1576 searching for a northwest passage to the Orient. His portrait on a 5-pence stamp is from a detail of a painting in Oxford's Bodleian Library, the background being a map adapted from a 1550 "Part of the World" by Desceliers.

Henry Hudson was also a seeker of the northwest passage in 1607; he discovered the bay, in a further effort in 1610, that is named for him. Most everyone knows that the river on the west side of Manhattan Island bears his name, from explorations for the Dutch East India Company that brought him here in the Half Moon in 1609. His portrait on a 7½-pence stamp is a detail from John Collyer's painting, "The Last Voyage of Henry Hudson," which is in the Tate Gallery, London. The background map, adapted from Petrus Plancius's World Map published in 1592, is from Monumenta Cartographica Volume II (1926), of which Dr. F. C. Wieder was editor.

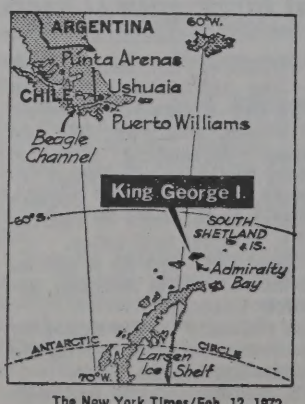
Robert Falcon Scott first went into the Antarctic in the Discovery in 1901, his gateway being the Ross Sea. It was during a later (1910) expedition that he and others traveled over the Aantarctic Continent to the South Pole. He and his discovery party perished on the return journey. His portrait on a 9-pence stamp is from a photograph at the Royal Geographical Society, the map background being adapted from the "Track Chart" of the main southern journey of the British Antarctic expedition of 1910-13, and Bartholomew's (1949) Comparative Atlas. The New York Times

All Are Safe as Antarctic Cruise Ship Goes Aground

SANTIAGO, Chile, Feb. 11 (AP)—The Norwegian cruise ship Lindblad Explorer, whipped by high, icy winds, ran aground off St. George Island in heaving Antarctic seas today. All her passengers, mostly Americans, were rescued by a Chilean navy transport.

Lindblad Travel, Inc., the New York agency handling the cruise, said 92 passengers and 84 crewmen were aboard. The Chilean Navy reported a total of 168 persons aboard. Most of the crew also were reported taken from the vessel.

[In New York, Lindblad Travel said the vessel carried a number of experts as lecturers. It identified them as Roger Tory Peterson, author, artist and ornithologist; Edwin A. MacDonald, a retired United States Navy captain who is an authority on ice-breaking operations; Francisco Erize, an Argentine naturalist, and Lars-Eric Lindblad, president of Lindblad Travel.]



The New York Times/Feb. 12, 1972

The vessel went aground off King George Island.

The Lindblad Explorer, built in 1969, picked up the passengers at Ushuaia on Argentina's southern tip and sailed Feb. 1. She was due back there Sunday.

The 2,480-ton ship, chartered by Lindblad for an Antarctic tourist cruise, began taking water before daybreak as 60-knot winds shrieked across Admiralty Bay.

King George Island, in the South Shetlands, is about 600 miles south of Cape Horn, the tip of South America.

Capt. Ladislao d'Hainud, commander of the Chilean Navy's Antarctic flotilla, dispatched the ocean-going tug Yelcho and the transport Piloto Pardo to Admiralty Bay. Chile has several research stations near the area.

The Piloto Pardo anchored near the grounded vessel while the Yelcho tied lines to the Lindblad Explorer to pull her off.

Tugs Free Cruise Ship

BUENOS AIRES, Feb. 28 (UPI)—The Government said today that tugs have freed the Norwegian cruise ship Lindblad Explorer from rocks in the Antarctic where she ran aground on Feb. 11 with 104 tourists abroad, all of whom were rescued. A German rescue tugboat, the Arctic, pulled the Norwegian ship free from rocks off King George Island on Saturday.

Soviets Get the Drift

Moscow, March 12 (AP)—The Soviet Union is beginning its biggest air expedition to the Arctic, Tass reported. Airplanes will be used to carry Polar explorers and equipment to sites already selected for drifting scientific stations.

Ward Randol, Ex-Head of Center For Exploration Here, Dies at 75

Ward Randol, special projects officer and former executive director of the World Center for Exploration and the Explorers Club, died Jan. 8 of a heart attack in White Plains Hospital. He was 75 years old and lived in Scarsdale, N. Y.

Mr. Randol had traveled to the Antarctic continent and as far north as the Arctic Ocean. He was credited with bringing together persons in science and exploration from all over the world. Last year, the Explorers Club awarded him the Edward Sweeney Medal for his services.

Becoming a member of the club in 1930, Mr. Randol served as its treasurer, taking a leading part in the acquisition of its headquarters at 46 East 70th Street. He was its executive director from 1962 to 1970, when he became special projects officer in charge of publications.

In 1926, Mr. Randol joined General Motors Corporation. He retired in 1961 as vice president of Motors Insurance Company, a subsidiary. He was born in Garden City, Mo., on March 31, 1896, and graduated from the University of Nebraska in 1922.

Mr. Randol was chairman of the Town of Greenburgh (N.Y.) Zoning Board of Appeals for 12 years and a member of the citizens advisory committee to its Urban Renewal Authority and a member of the Municipal Planning Federation of Westchester County.

Chapleau-Osborne

Ward Randol

Surviving are his widow, Gertrude; two sons, Ward Jr. and Herbert B.; a daughter, Mrs. Robert F. Romanet; two brothers, Jess and George; three sisters, Mrs. Roy Durham, Mrs. Carl Curry and Mrs. W. R. McKinley and four grandchildren.

Amundsen's Sloop on Long Trip to Norway

April 22

SAN FRANCISCO (AP) — After 66 years sitting in the sand at Golden Gate Park facing the Pacific, the 70-foot sloop Gjoa has begun a long journey home to Oslo, Norway.

Roald Amundsen and his iron-bound little vessel arrived here in 1906, both 31 years old, after blazing a trail through the Northwest Passage—a route across the top of the American continent to the Orient sought by explorers for four centuries.

He had started from Oslo three years before in the former fishing vessel, pursued by creditors whom he paid back later from the proceeds of his lectures.

The famous Norse explorer went on to earn fame as the first to locate the magnetic north pole, the first to reach the south pole and vanished in 1928 during a rescue mission in the Arctic.

The Gjoa was presented to San Francisco by Norway, and enshrined in a "drydock" in the sand facing the ocean. Through the years she has weathered and become the victims of occasional vandals. Despite repeated repairs and repainting jobs she shows her age—almost a century.

The Gjoa Foundation of San Francisco, an association of local Norsemen, has raised the money to send her back to Norway on a freighter, where she will take her place in the National Maritime Museum at Oslo.

Rolf B. Schou of the foundation estimates that the museum may spend half a million dollars to restore her.

After her mast was unstepped, she was trucked Thursday to Pier 48 where she will be loaded aboard a Norwegian freighter for the voyage home.

Antarctic Ship Fuji Returns After Failing to Reach Base

May 17

The 7,760-ton Antarctic observation ship Fuji which was stranded repeatedly in thick ice packs returned to Tokyo early Tuesday morning with members of the 13th expedition team.

Also aboard the ship were 25.5 tons of cargo including a large fuel tank, a crane truck and a rocket dome which were to have been delivered to the Japanese Antarctic base.

This was the second time in a row that important supplies had to be brought back because of the ship's inability to reach the base.

It happened despite the fact that the ship had undergone a major mechanical alteration that was designed to make it withstand and pull through ice.

The ship which arrived back at Tokyo carried a crew of 182 and a 10-member expedition team headed by Zembei Kiyono.

The Fuji left Tokyo Nov. 25 last year to transport materials and wintering team members to the Japanese observation base on Ongul Island at Luetzow-holm Bay.

It arrived in the Antarctic waters at the end of December.

The ship reached a point some 30 km. north of the Japanese base on Feb. 14, but was unable to proceed further because of ice measuring four meters thick.

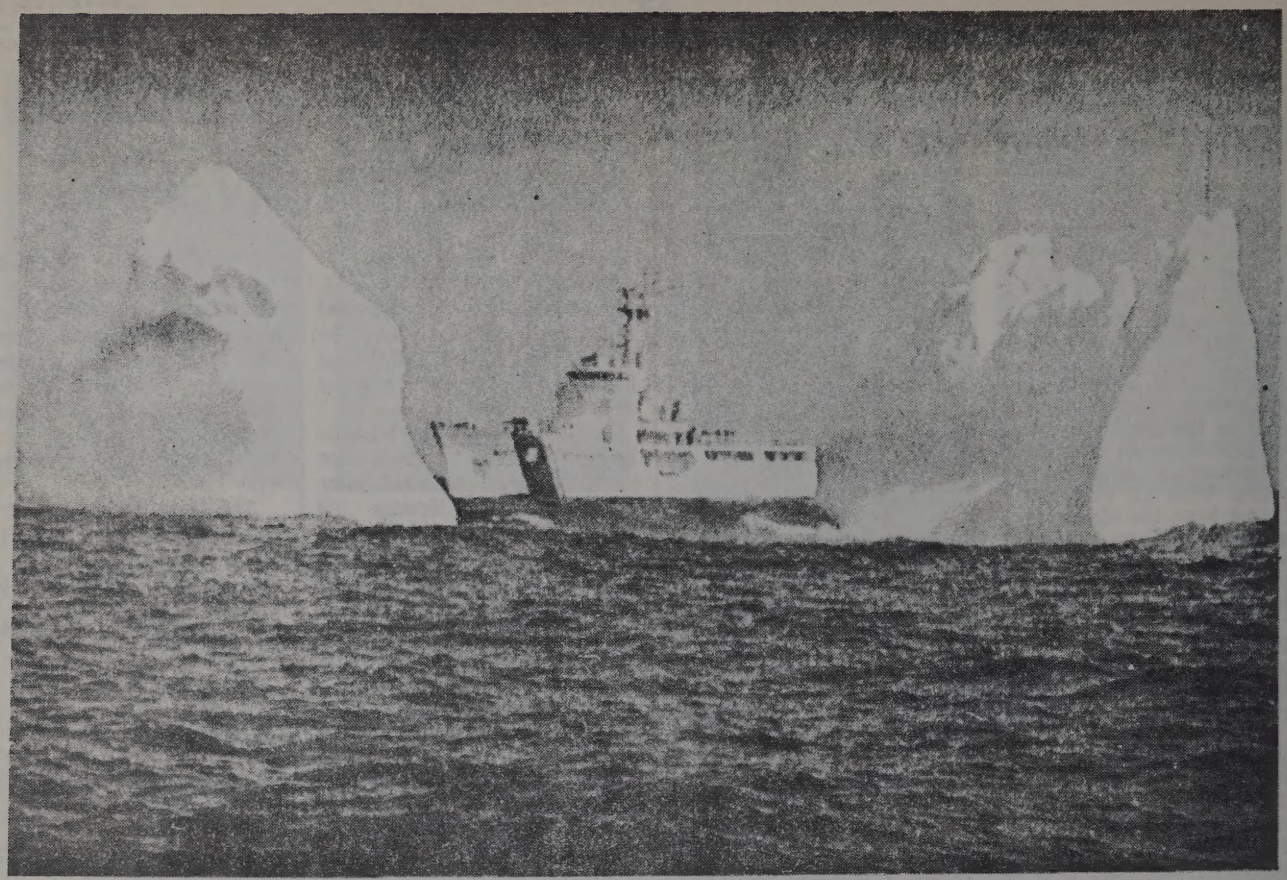
As a result, the ship airlifted some 470 tons of light materials and 30 members of the wintering team to the base by helicopters.

The ship left the Antarctic waters for home Feb. 23, but was trapped by thick ice again.

GREENLAND — April 20: King Frederik IX Memorial, 60 ore plus 10o (red), portrait and Royal Yacht "Dannebrog" anchored off Umanak. Designers, J. Rosing, Czeslaw Slania; engraver, Slania; recess.

The issue features dogsledge travel and conveyance of mail in the nation through the ages.

The Crown Agents Bureau has announced that the above shown four values were released on Jan. 5 by South Georgia to celebrate the 50th anniversary of the death of Sir Ernest Shackleton. Values and designs include 1½ pence, "Endurance beset in Weddell Sea;" 5p, "Launching James Caird;" 10p, "Route of James Caird;" and 20p, "Quest."



Coast Guard Cutter Vigorous moves behind iceberg tips on a recent iceberg patrol in the North Atlantic during a season of the heaviest iceberg sightings since the late 1950s.

Scientist crouches on Antarctic ice to snap a picture of a Weddell seal, whose diving habits are under study.

The New York Times